OCTOBER 6, 1952

STEEL

THE WEEKLY MAGAZINE OF METALWORKING

ENGINEERED PACKAGING

Science is taking industrial containers out of the shipping room, p. 57

✓ **DECISION ON AIRCRAFT, p. 47**
Quality, not Quantity, for a While

✓ **HANDLING A BIG FORGING JOB, p. 76**
Modified Methods Ease Press Pinch

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Improvising Speeds Delivery Date

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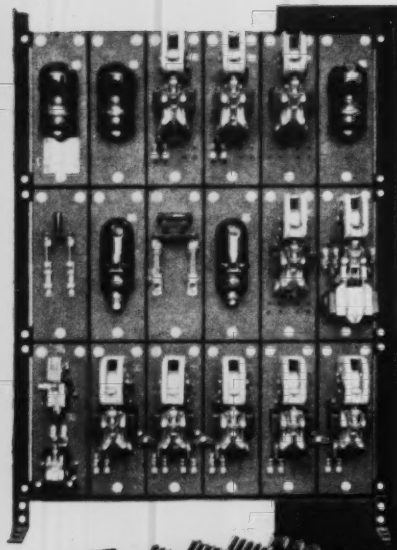


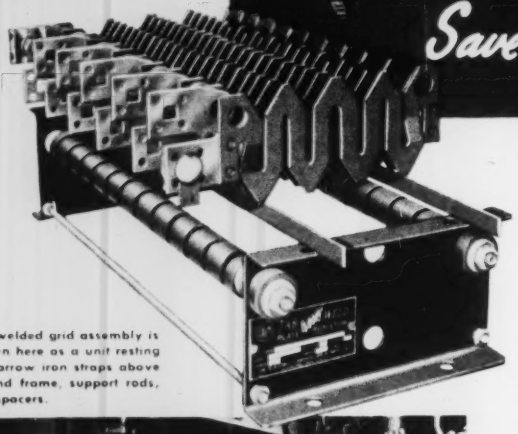
LOOK for these NAMES when buying Motor Control

1 LINE-ARC Contactors
2 TIME-CURRENT Acceleration (D-c)
3 FREQUENCY RELAY Acceleration (A-c)
4 WRIGHT CIRCUIT Hoist Control (D-c)
5 YOUNGSTOWN Hoist Limit Stops
6 TYPE WB Brakes
7 CAM Master Switches
8 MANUAL-MAGNETIC Disconnect Switches
9 CONTRA-TORQUE Hoist Control (A-c)
10 TAB-WELD Resistors

These FUNCTIONAL NAMES Speak for Themselves

TAB WELD PLATE RESISTORS

Save Initial Cost and more



The welded grid assembly is shown here as a unit resting on narrow iron straps above its end frame, support rods, and spacers.

Installation of TAB-WELD Resistors used with EC&M quadruplex controller.

Save up to 1/6th on maintenance and inspection costs with EC&M TAB-WELD Plate Resistors.

No burning at grid-eyes or at tap-plates — ohmic value is stabilized — made of corrosion-resistant alloy steel — non-breakable — negligible resistance change between cold and maximum working temperatures — dimensionally stable, high dielectric, non-carbonizing insulating spacers. Also, accurate mounting hole dimensions maintained regardless of variations in length of grid stack.

Use these advantages to pare down upkeep costs. TAB-WELD construction saves the initial cost and more — specify EC&M Bulletin 942 TAB-WELD Plate Resistors.

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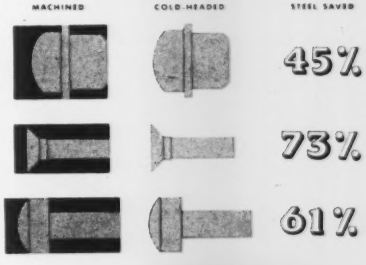
Cold-Heading Saves Steel



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BETHLEHEM WIRE

BETHLEHEM STEEL

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These operations illustrate a case history of the economy and efficiency of the LANDEX Head, designed for cutting precision threads at high production rates on automatic screw machines and other "live" spindle equipment.

In this instance, ½" American Standard Pipe Threads are being generated on sprinkler frames cast of red brass. The threads are cut into a relief 3/32" wide.

The wisdom of the tool engineer in selecting LANDEX Heads for performing these threading operations is borne out by information secured from the cost sheets. Production consistently averages 300 pieces per hour, floor-to-floor time, at a total threading cost of two-tenths of a cent per piece. Tool cost was held to a minimum with 5,000 pieces being threaded between chaser grinds.

This is just one example of many successful applications of the LANDEX Head to jobs requiring high-speed thread production at an economical cost. For additional information, write for Bulletin F-90.

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1023

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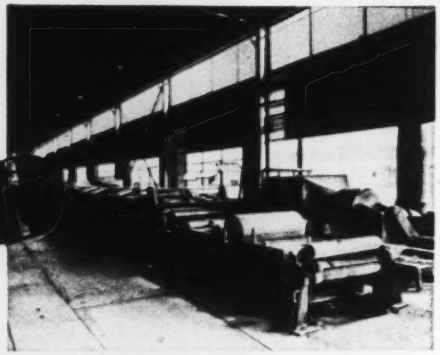
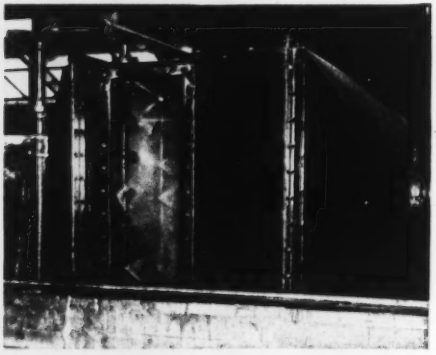


TANKS and COVERS

WHEREVER metal surfaces are exposed to corrosive acids in this pickle line—tanks and covers, fume duct and scrubber equipment, exterior stack—protection comes from PLIOWELD—Goodyear's *permanent* anticorrosion lining of rubber bonded to metal. Every PLIOWELD installation is formulated especially by the G.T.M.—Goodyear Technical Man—to meet the exact demands of the job. To get his assistance with your corrosion problems, see your nearest Goodyear Industrial Rubber Products Distributor, or write Goodyear, Akron 16, Ohio.



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GOODYEAR

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This Week in Metalworking

STEEL

Vol. 131 No. 14 Oct. 6, 1952

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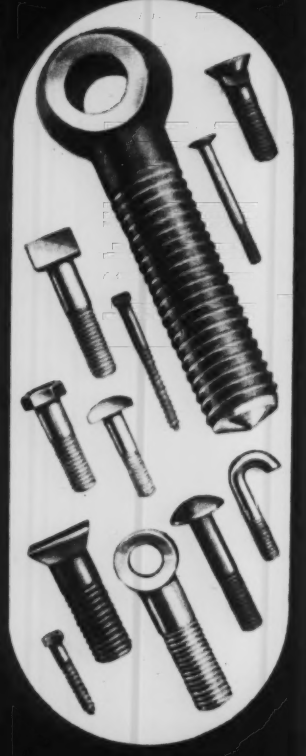

Among Pawtucket's many specialty products these lower-cost eye bolts or swing bolts are the leaders in this field. Pawtucket's exclusive production method keeps cost low, dimensional accuracy unusually high and strength above standard.

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THE PLACE TO SOLVE YOUR BOLT PROBLEMS

Thought for the Week

We heard this on the radio the other day. "It's your right and privilege NOT to vote, if you so desire. However, if many of us exercise that right very often, we may lose all of our other rights and privileges."

Cover Stuff

This week's cover photo was furnished by R. A. O'Reilly Jr., packaging engineer for General Motors Corp. Assistant Editor Art Zimmerman got it when he was in Detroit working on the industrial packaging article for this issue.

It's a shot of a semi-automatic packaging line at the Delco Products Division, Dayton, O. The line is 80 feet long and integrates five separate operations. It consists of standard machinery, rebuilt to do this particular job. Machines will handle any style shock absorber Delco makes and can be adjusted for either corrugated or folding boxes. Installation of the line reduced the number of operators required from 17 to 7. Production limit is 1500 pieces per hour.

For Dubbers

For those of us who puzzle the lack of distance on our drives and attribute it to the golf ball, these figures might be a bit of a jolt. To hit the ball 200 yards we have to move the clubhead at 135 feet per second. At about 175 feet per second the ball would go about 250 yards—if we hit it right. No wonder!

Close Shave

We had a note the other day from one of our New York Editors, Sam Baker. It seems that while he was talking to someone at Air Reduction Co.'s New York office this tale came to light.

There's a new shaving method in the works. Chandu, The Magician, called Airco and asked for permission to use their equipment for a demonstration on a nation-wide television show.

Chandu, a flame swallower from 'way back, not only shaves with the welding torch, but as an added attraction puts on a cutting head, pipes the flame in his mouth and snuffs it out with his tongue. It seems several thousand degrees roaring down his throat doesn't bother Chandu a bit.

Following a hurried conversation with the legal department, the Airco man politely demurred to the suggestion that company equipment be made available for the show. A similar rebuff came from Linde Air Products Co.

The asbestos-lined magician warns against just anyone trying the trick, in case you're thinking of turning the welding department into a barber shop. Spot check of razor companies found none preparing to file bankruptcy petitions because of the intrusion on their domain.

Puzzle Corner

Due to last week's crowded column we had to omit the Puzzle Corner. That leaves us with two puzzles to answer this time. Here they are:

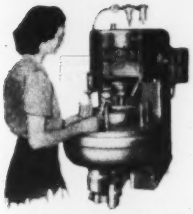
The clock in the Sept. 15th issue cost $20. First in with the answers for that one are: Ralph Pappenheimer, Specialty Device Co., George W. Frederick, Republic Steel Corp., Grace B. Parr, Federal Mogul Corp., R. W. Jeinberg, Ingalls Iron Works Co., Margaret Delaney, Philadelphia Ordnance District and Chas. J. Luhn, Jos. Honhorst Co.

Cards in the puzzle of Sept. 22nd are arranged Ace, Q, 2, 8, 3, J, 4, 9, 5, K, 6, 10, 7. First with that one were: L. D. Rice, Timken Roller Bearing Co., I. C. Darcy, Standard Forgings Corp. and George W. Frederick, Republic Steel Corp.

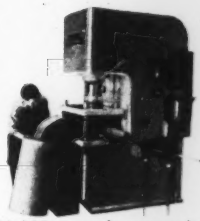
Puzzle for this week is suggested by R. C. Howe, Armco Steel Corp. A word of warning—double check your first answer, this one's a bit tricky. Here it is: In a room 40 feet long, 10 feet high and 10 feet wide there is a fly in center of end wall, 1 foot up from the floor. There is a spider in the center of the opposite wall 1 foot down from the ceiling. What is the shortest distance the spider must walk to get the fly? Assume the spider does not wander off the surfaces of the walls, ceiling and floor.

Shrdlu

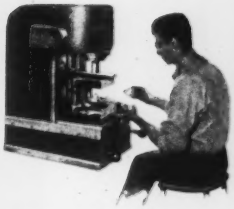
(Metalworking Outlook—Page 39)



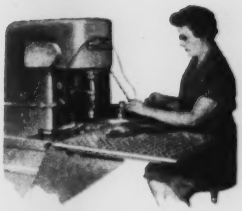
Assembly speed is doubled using Multipress to crimp a small brass contact to pen-type flashlight cases



20,000 mop clamps a day is cost-cutting speed of 35-ton Multipress using roll-feed and 4-stage dies

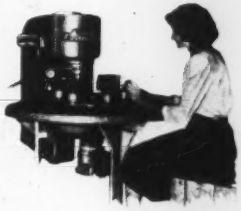


Dies stay sharp twice as long when Multipress is used in trimming flash and gate from die castings

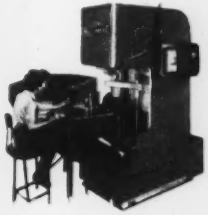


Scrap losses drop sharply as Multipress doubles staking speed on high precision voting-machine counter wheel

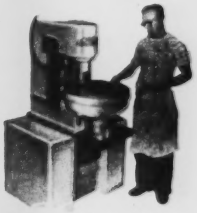
Six hours saved on every 100 finished units as famous electric cleaner plant adopts Multipress to clean cast housings



Output is boosted by 100% by famous toy train maker, staking 6-part assembly together with Multipress



At twice the speed of previous method, Multipress assembles bolts on electrical insulator holders



1600-per-hour rate slashes production costs when 4-ton Multipress is used to broach serrations on small cams

No down-time for repairs in 7 years for Multipress used to bend tabs and arch locks on steel clamps at high speed

Speed doubled on delicate job of drawing thin phosphor-bronze tubes used in forming sensitive thermostat bellows

Less operator fatigue noted as Multipress Midget assembles two check valves to main valves at 450 per-hour

In only four stages, Multipress deep-draws a precision ordnance part formerly requiring 8 draws

Speaking of Trends... MULTIPRESS®

Thousands of actual Multipress installations prove that its smooth, oil-hydraulic power control is the surest answer to growing demands for faster production, better quality control, quicker tool changing, safer operation, and lower scrap losses.

It offers complete, stepless adjustability of ram speed, pressure and stroke length. Manual and automatic models in a complete range of sizes and capacities up to 50 tons.

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ELECTROMET Data Sheet

A Digest of the Production, Properties, and Uses of Steels and Other Metals

Published by Electro Metallurgical Company, a Division of Union Carbide and Carbon Corporation, 30 East 42nd Street, New York 17, N. Y. ● In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario

New Foundry Alloy Neutralizes Effect Of Varying Section in Gray Cast Iron

Low-Carbon Foundry Ferrochrome is a new silicon-chromium alloy specially developed by ELECTROMET for the alloying of cast iron. It is so balanced in composition that it increases the strength and Brinell hardness of gray iron, as well as its resistance to wear and corrosion, without increasing the chilling tendency of the metal.

The alloy has a nominal analysis of 50 per cent chromium and 30 per cent silicon. It has excellent solubility in iron, and the inoculating effect of the silicon content makes it possible to add up to 1 per cent chromium to gray iron as a ladle addition, with no appreciable increase in chill depth. Light section castings, such as automobile and truck exhaust manifolds and stove parts, may easily be produced in 1 per cent chromium iron by a simple ladle addition of the alloy to any base iron that would be suitable for casting the same parts in unalloyed iron.

Effect on Chill Depth

Fig. 1 illustrates how chill depth was affected by varying additions of the new alloy to a commercial cupola iron analyzing 3.24 per cent carbon and 2.12 per cent silicon, with 0.12 per cent residual chromium. A chill depth of approximately $\frac{1}{4}$ of an inch was obtained in all of these typical hatchet-type chill test specimens.

Effect on Mechanical Properties

Although Low-Carbon Foundry Ferrochrome was especially developed for decreasing the section sensitivity of gray iron castings, it is also useful in obtaining moderate increases in the strength of gray iron, when used alone or in combination with the alloys nickel, molybdenum, or vanadium. An unalloyed base iron, analyzing 3.43 per cent carbon and 1.95 per cent silicon, was treated with additions of 0.36 per cent and 0.84 per cent chromium. The following table gives the complete analyses of the irons. It shows how both Brinell hardness and tensile strength were improved by the alloying additions.

Analyses	Brinell Hardness	Tensile Strength
3.43% total carbon, 1.95% Si, 0.05% Cr.	202	31,000
3.41% total carbon, 2.20% Si, 0.36% Cr.	217	35,400
3.32% total carbon, 2.56% Si, 0.84% Cr.	228	36,100

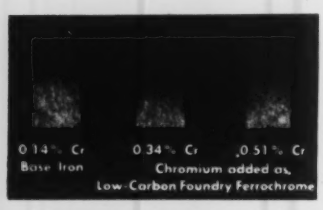


Fig. 1. These fractures of broken chill specimens show the effect on chill of chromium additions made with Low-Carbon Foundry Ferrochrome.

Auto Cylinder Castings

Addition of chromium to cast iron in the form of Low-Carbon Foundry Ferrochrome tends to stabilize the pearlitic structure of the iron, and to eliminate areas of soft secondary ferrite in slowly cooled sections. Moreover, the alloy helps avoid difficulties with chilled corners or edges in thin sections. It is therefore particularly well suited for producing a cylinder-type iron with consistently good structure and improved uniformity of hardness in sections exposed to widely varying cooling rates.

An example of the usefulness of this alloy is illustrated in Fig. 2, which shows strips cut from the bores of three automotive cylinder blocks. The base iron used in these castings was a typical unalloyed cylinder grade of cast iron, analyzing 3.38 per cent total carbon, 2.07 per cent silicon, and 0.08 per cent residual chromium.

The design of these castings was such that a heavy boss close to the cylinder bore caused slow cooling along one side, resulting in a soft area and wide variation in hardness along the length and around the perimeter of the unalloyed cylinder.

The strips illustrated in Fig. 2 were cut from the soft side of the cylinder bore. When subjected to a Rockwell B hardness exploration, casting No. 1 showed a variation in hardness from 92.2 to 80.2 Rockwell B (196 to 150 Brinell*). Casting No. 2 showed a variation from 94.0 to 90.8 Rockwell B (205 to 189 Brinell). Casting No. 3 showed a variation from 95.5 to 90.3 Rockwell B (213 to 187 Brinell).

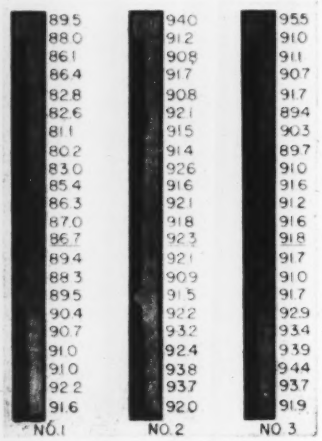


Fig. 2. Average Rockwell B hardness values at indicated positions in strip specimens from the bores of three cylinder block castings. No. 1-Untreated base iron containing 0.08% chromium. No. 2-Treated with 0.31% chromium added as Low-Carbon Foundry Ferrochrome. No. 3-Treated with 0.44% chromium added as Low-Carbon Foundry Ferrochrome.

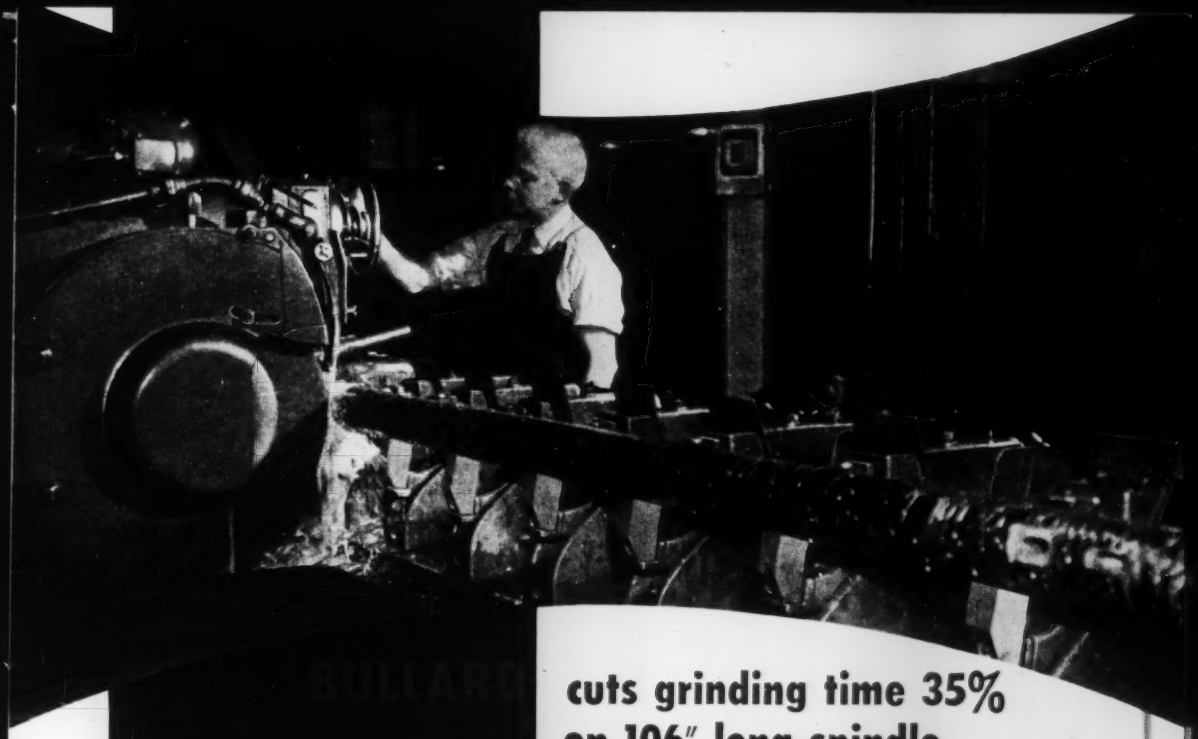
The small chromium additions made in cylinders Nos. 2 and 3 had a marked effect in reducing the hardness spread and also in stabilizing the desired pearlitic structure in critical areas of the cylinder bore. This provided satisfactory resistance to wear in spite of difficulties introduced by an admittedly difficult design. Similar problems exist in most iron foundries—problems that Low-Carbon Foundry Ferrochrome can help solve with a minimum change in melting practice and at a very reasonable cost.

Booklets Available

Further information about this new ferrochrome is given in the booklets, "New Chromium Alloy Neutralizes Effect of Varying Cooling Rate in Gray Iron" and "Silicon-Chromium Alloy in Complicated Iron Castings." You may obtain copies, free of charge, by writing or phoning to the nearest ELECTROMET office: in Birmingham, Chicago, Cleveland, Detroit, Los Angeles, New York, Pittsburgh, or San Francisco. In Canada: Welland, Ontario.

*All Brinell hardness values were obtained by conversion from Rockwell B.

The term "Electromet" is a registered trade-mark of Union Carbide and Carbon Corporation.



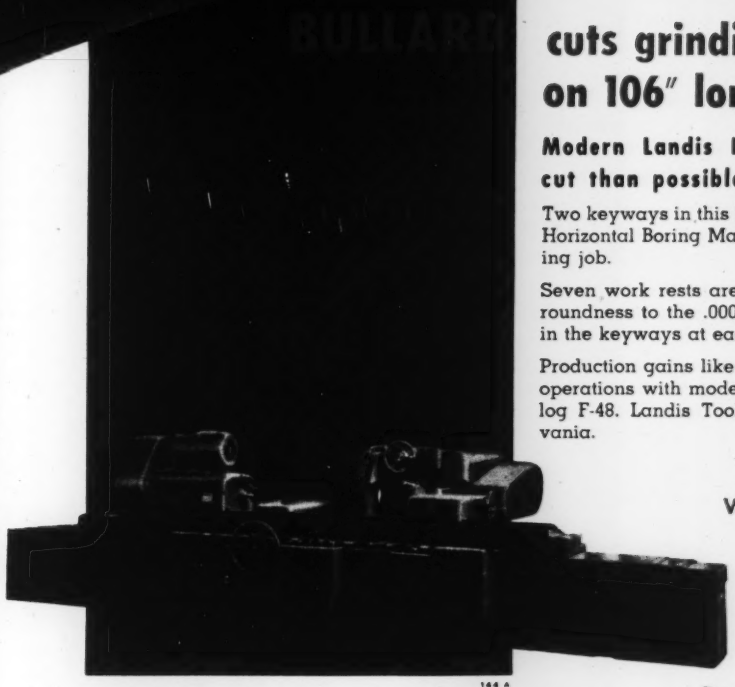
cuts grinding time 35% on 106″ long spindle

Modern Landis Plain Grinder takes heavier cut than possible on old equipment

Two keyways in this long Nitralloy spindle for the Bullard Horizontal Boring Machine help make this a tough grinding job.

Seven work rests are used to maintain straightness and roundness to the .0002″ tolerance. Filler blocks are used in the keyways at each work rest.

Production gains like this can be made on your grinding operations with modern Landis Grinders. Write for Catalog F-48. Landis Tool Company, Waynesboro, Pennsylvania.



144 A

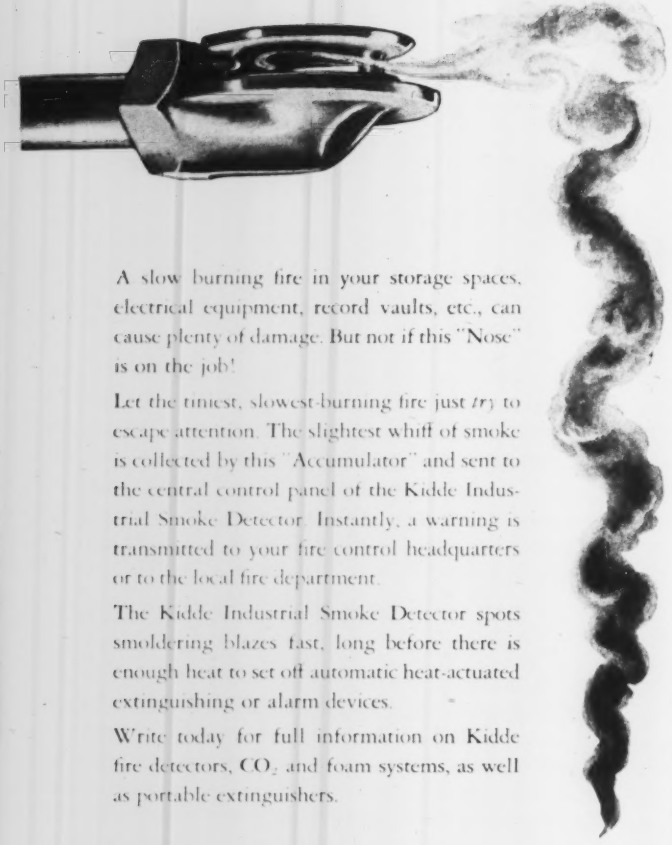
Work Data

Machine	Landis 20″ x 144″ Type F Plain Grinder
Material	Nitralloy—4″ diameter x 106″ long
Stock Removal	.030″ on diameter
Tolerance	.0002″ for roundness and size
Production	7 hours grinding time

LANDIS

precision grinders

fire can't hide from this "Nose"



A slow burning fire in your storage spaces, electrical equipment, record vaults, etc., can cause plenty of damage. But not if this "Nose" is on the job!

Let the tiniest, slowest-burning fire just *try* to escape attention. The slightest whiff of smoke is collected by this "Accumulator" and sent to the central control panel of the Kidde Industrial Smoke Detector. Instantly, a warning is transmitted to your fire control headquarters or to the local fire department.

The Kidde Industrial Smoke Detector spots smoldering blazes fast, long before there is enough heat to set off automatic heat-actuated extinguishing or alarm devices.

Write today for full information on Kidde fire detectors, CO_2 and foam systems, as well as portable extinguishers.

Kidde

Walter Kidde & Company, Inc.

1060 Main Street, Belleville 9, N. J.

Walter Kidde & Company of Canada, Ltd., Montreal, P. Q.

Steel Guide Vindicated

I have clipped the Tool Steel Guide (June 16) and find it of such help that we should like to have 10 copies to spread among our personnel.

We have one question in reference to the Simonds Saw & Steel Co. listings. We received some of their "Red Streak" for treatment recently and it was plainly marked Red Streak and was identified as an oil hardening non-deforming type of die steel. Referring to the guide we found it listed as an 18-4-1 high speed steel. We'd appreciate an explanation.

The guide is a boon to us commercial heat treaters who get stuff for treatment with only a trade name to go by. Sure glad you boys worked it up.

C. F. Lewis
metallurgical engineer
Cook Heat Treating Co. of Texas

• *We asked C. R. Patenbach, steel sales manager, Simonds Saw and Steel Co., for the explanation. His reply: "We at Simonds' Lockport, N. Y., mill can appreciate the possibility of confusion under certain conditions, although we at Lockport have only one steel which we have listed with the trade name "Red Streak", and that is our 18-4-1 high speed (as listed in the Tool Steel Guide). Our factory in Fitchburg, Mass., where the finished products are produced, has used the term "Red Streak" as a trademark on quite a few of their products. If we ever find that any number of people are being confused due to our calling the high speed grade "Red Streak", I suppose we may have to change the name of our steel mill product because we have only one. If you have additional comments or inquiries we would certainly appreciate your advising us of them."—ED.*

What To Do With Old Tin Cans

I am a Health Officer with the Rockdale Municipal Council, and have been allotted the task of investigating the possibility of salvaging old tin cans, etc., that arrive in enormous numbers at our municipal garbage dump.

I recently read your article "New Future for Old Tin Cans" (Oct. 22, 1951, p. 52). As a result I am interested in getting additional information regarding this subject from the Steel Briquette Corp. of Atlanta.

C. Daly
Health Officer
Rockdale, N.S.W.
Australia

• *Your request has been forwarded to the Steel Briquette Corp., c/o Julius L. Chazen & Associates, 221 Volunteer Bldg., Atlanta.—ED.*

Mill Capacity Questioned

The Mar. 3 issue of STEEL presented an excellent special report covering the build-up in steel production capacity in which open hearth, bessemer and elec-

Story of a Reliefer that became the No. 1 Starter

IT CAN HAPPEN with machines as well as men. Ask the Powers Regulator Company of Skokie, Ill. —manufacturer of automatic temperature and humidity control systems.

Powers Regulator, like many companies these days, was faced with the necessity of increasing production of a battery of turret lathes, some of which needed replacement. They also wanted to call in some of their subcontracted work. So they bought a Warner & Swasey 1-AC Single Spindle Automatic to help take the pressure off their hand-operated machines.

This company soon discovered that they had never fully realized the tremendous work potential of the 1-AC. It kept taking over more and more turret lathe work—increasing the production on some of the more complex pieces as much as three times. So the company scheduled the 1-AC for additional shifts—still more work.

Today the machine is running three 8-hour shifts, 6 days a week. It has eased the load on the turret lathes—and the company has recovered work previously subcontracted. They now have another 1-AC on order.

This story is not unusual. The 1-AC's quick setup and extreme accuracy make it ideal for increasing production on many turret lathe jobs—while requiring less skilled operators. And its advantages as an automatic cuts costs on short and long run jobs. But find out how the 1-AC will boost profits in your plant—call in our nearest Field Engineer for all the facts.

WARNER & SWASEY
Cleveland

YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS WITH WARNER & SWASEY MACHINE TOOLS, TEXTILE MACHINERY, CONSTRUCTION MACHINERY

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He plots proper machine feed, speed and method of tool driving.

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then . . . he develops practical design and engineering specifications for a special cutting tool, metallurgically "tailor-made" for your application.

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These resources, plus Gorham's more than thirty years' reputation for producing the finest cutting tools, are dedicated to furnishing prompt and profitable solutions to your special tooling problems. Gorham-engineered "specials" are turning problems into profits in thousands of plants every day . . . why not let them do the same for *you?*

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Gorham TOOL COMPANY

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LETTERS

Concluded from preceding page

tric furnace capacities were detailed plant by plant throughout the U. S.

We are very much interested in obtaining similar information on rolling mill capacity in the U. S. and Canada. We are particularly interested in the annual tonnage and size of the facilities available.

S. E. Lapp
Nelson Stud Welding
Lorain, O.

• *Latest listing of rolling mill capacities in the U. S. and Canada was issued in 1951 by the American Iron and Steel Institute, and the Oct. 1, 1951 issue of* STEEL *carried a special report of the capacities company by company. A copy of the special report has been sent. For plant by plant details refer to the 1951 "Directory of Iron and Steel Works of the U. S. and Canada" published by the American Iron and Steel Institute, New York.—ED.*

Good News Travels

We are subscribers to STEEL and would very much appreciate receiving three reprints of your article "Fairless Works—Steel Man's Dream" (Sept. 22, p. 121).

H. Kern
Brussels Corp. for International Trade
New York

I would appreciate receiving a copy of your "Midyear Review and Forecast for Steel Users" (June 30).

William Copulsky
W. R. Grace & Co.
New York

Please send 50 copies of your article "Machinability Theory Pays Off" (Aug. 18, p. 98) by R. K. Gould.

W. Roberts
LaSalle Steel Co.
Chicago

. . . please send a couple more copies of "Machinability Theory Pays Off."

A. R. Dunphy
The Texas Co.
New York

• *Reprints have been sent.—ED.*

Steel Consumption Down South

We're interested in getting an approximate figure concerning the amount of hot and cold-rolled steel bars consumed by the southern states—Mississippi, Alabama, Georgia, Florida, South Carolina, North Carolina and Tennessee. Could you help us obtain such information?

C. Tanner
Automatic Screw Machine Products Co.
Chicago

• *There has been only one report on consumption of various types of finished types of finished steel. It is known as "Geographic Distribution of Consumption of Metal Mill Shapes and Forms and Castings, 1947", issued by the U. S. Bureau of the Census. The report does not break down bars as to hot rolled and cold finished. It lists carbon bars and shapes and alloy steel bars and shapes. The 1947 consumption of carbon steel bars and shapes in the seven states you mention was: Mississippi, 16,623 net tons; Alabama, 88,834 net tons; Georgia, 19,822 net tons; Florida, 6567* net tons; South Carolina, 1591 net tons; *North Carolina, 12,616 net tons; and Tennessee, 29,579 net tons.—ED.*

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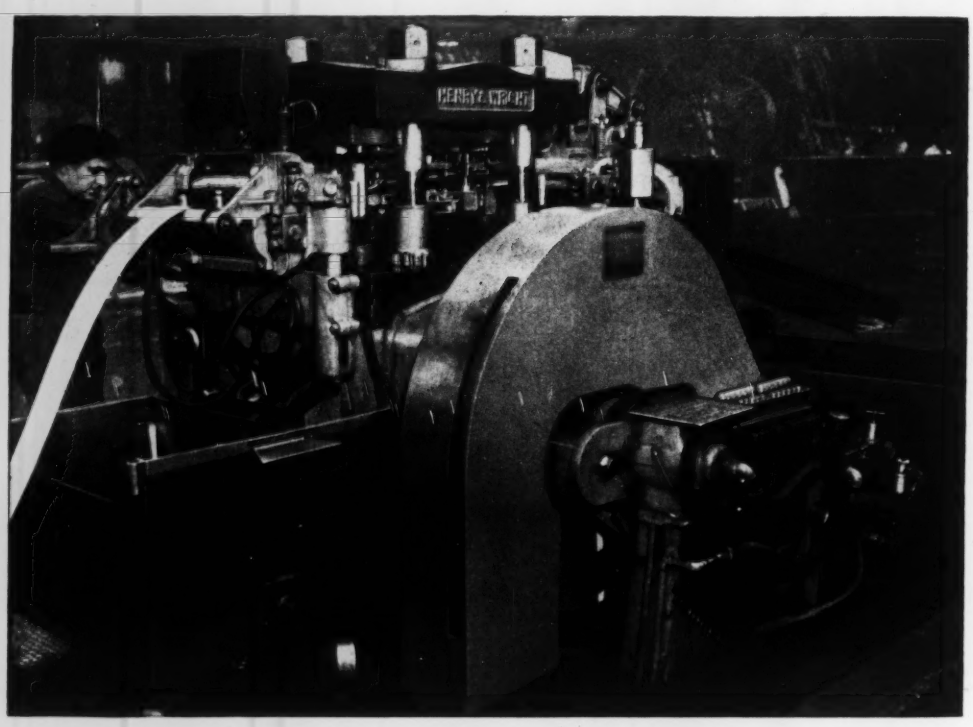
First, you can combine operations — use progressive dies for metal stamping jobs that normally would require several presses. Second, you get high speed at no sacrifice in quality of work. Third, you get longer die life.

These benefits are inherent in the design of the Henry & Wright Dieing Machine. It is built to give them. Note low center of gravity — flywheel, crankshaft, connection are below the punchholder. This permits high speed, but minimizes vibration.

Maximum guiding surface is provided in the four-post punchholder guide, assuring constantly accurate alignment. A pulling stroke is applied to the die and the punchholder takes only the load required to do the work in the die. Any angular thrust from the crankshaft is absorbed by the lower crosshead.

For more pieces per minute and between grinds — for less handling and more finished work — modernize with Henry & Wright Dieing Machines. They are precision-built to do precise work.



In Chrysler's Highland Park Plant, Henry & Wright Dieing Machines are used to make fluid coupling fins and torque converter impeller blades. Note the low center of gravity of the Henry & Wright Dieing Machine. It allows high speed with minimum vibration.

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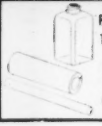

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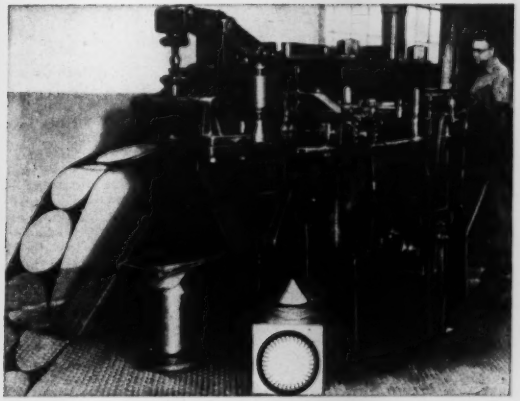
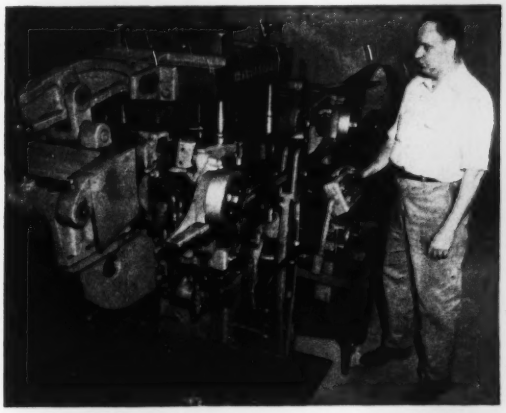
HARTFORD 1, CONNECTICUT

Modernize Metal Stamping-
with Henry & Wright Dieing Machines

Knapp-Monarch Produces completed rotor and stator laminations for its electric motors on 25-ton and 50-ton Henry & Wright Dieing Machines. Both pieces are made at once, at speeds substantially in excess of equipment previously used.



Rotor and Stator Laminations are made simultaneously of silicon steel on 150-ton Henry & Wright Dieing Machines at Fairbanks, Morse & Co. Unique feature of H & W design is that the upper crosshead takes only the pressure required to do the work in the die.



Numerous Types of motor laminations are made on the Henry & Wright Dieing Machines operating at General Industries. This illustration shows another unique advantage of these machines — the four post guide to the upper crosshead, which assures accurate and constant alignment.

Only the best is good enough

FACT PACKED CATALOG

Complete descriptions of all Henry & Wright Dieing Machines. Write: Henry & Wright, 441 Windsor St., Hartford 5, Conn.

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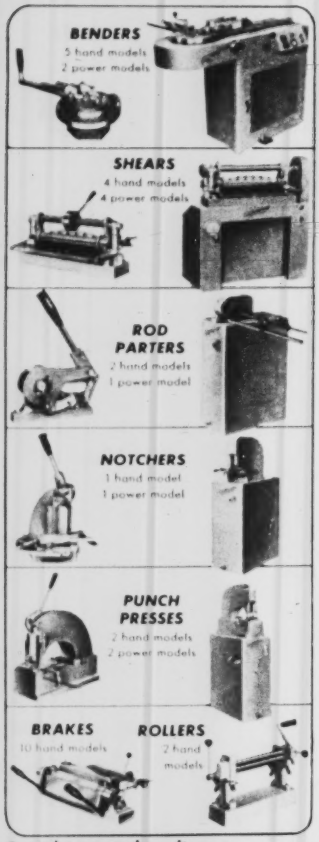
for Die-less Duplicating



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Let these pessimists read the future in the census returns. There is a tremendous upsurge in our population. Last year nearly 4 million babies were born. By 1960 we shall total 170 million people--30 million more than when war ended in 1945. This adds to our domestic market more people than there are in Canada and Australia combined.

Providing for these 30 million new Americans can keep our production machinery going at capacity. They call for new hospitals, schools and churches. Larger families need bigger houses to replace post-war houses that are too small now. More and bigger families need improved home equipment and more new automobiles. In short, to maintain and improve living standards for our children, we must work harder than ever before. To supply the needs of our 1960 population, including adequate national defense, it is estimated that the productivity of the individual worker must increase at least 30%, with additional investment of over 200 billion dollars in capital facilities.

There should be no room in this picture for depression. But we must have economy in government, elimination of waste and extravagance and a reduction of taxes and public debt. If we encourage private incentive, thrift and investment, we can bring about the greatest advance in health, wealth and happiness that America has ever known.

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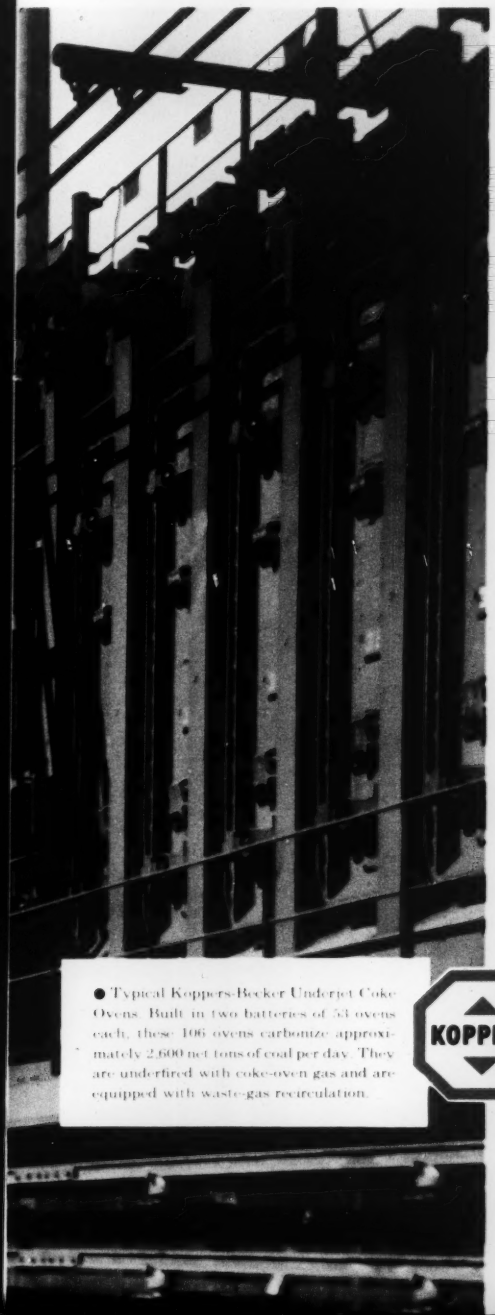

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B constant engineering refinements

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C skilled engineering staff

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Constructing coke ovens and related equipment is just one way in which Koppers serves the steel industry. For any kind of metallurgical construction, you can count on Koppers. You are invited to consult with our Engineers and Management.

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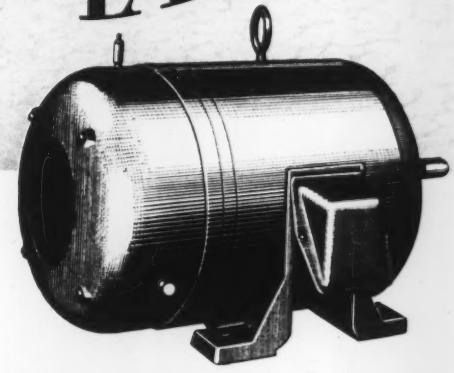

EBCo-built U.S.S. Perch in maneuvers off Alaska. Official U.S. Navy photo.

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"From now on, it's TUFBAK and wet sanding for me."
LOS ANGELES, CALIFORNIA
"TUFBAK sanded 3 times the area the best competitor could sand. Paper much faster cutting."
HOUSTON, TEXAS
"Sharpest paper I ever saw. TUFBAK is really tough."

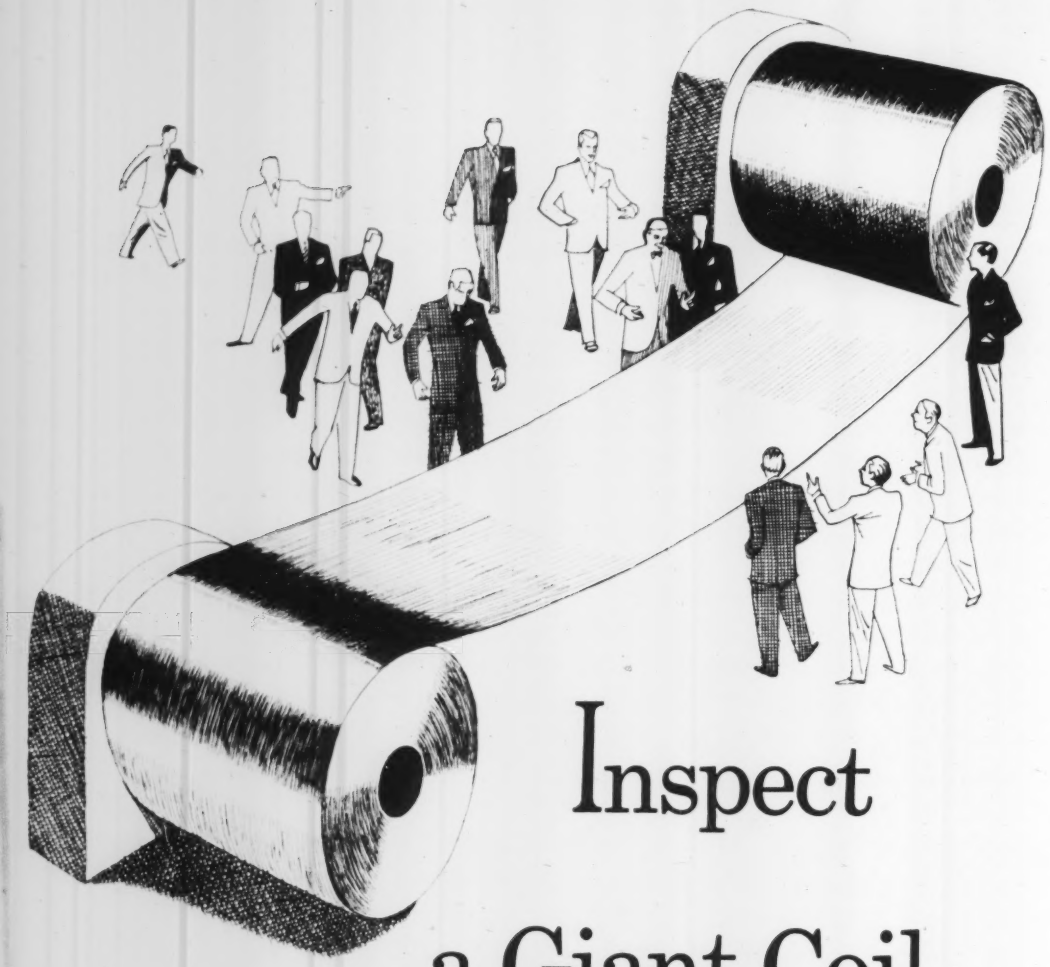
CLAIM for TUFBAK
SANDING PAPER IN YEARS

"The waterproof paper you just can't criticize."
BOSTON, MASS.
"So good, there just isn't any comparison."
CLEVELAND, OHIO
"TUFBAK works like magic. It sands faster and lasts longer."
SAINT LOUIS, MO.
"This is the best paper I have ever used."
WILMINGTON, N. C.
ATLANTA, GA.
NEW ORLEANS, LA.
"TUFBAK is the best waterproof paper on the market."

TUFBAK SPEED-WET® DURITE® Paper Waterproof is a brand new exclusive development of BEHR-MANNING combining the best features of proven, sharper-cutting silicon carbide abrasive grains with a stronger, better backing and new bonding techniques. For the fastest sanding job ever, try TUFBAK now. Order from your Distributor. Or, for further information write to Behr-Manning Corp., Troy, N. Y., Dept. S-10.

BEHR-MANNING CORPORATION
division of NORTON Company

▲ COATED ABRASIVES
▲ SHARPENING STONES
▲ PRESSURE-SENSITIVE TAPES



Inspect a Giant Coil of Brass

See why SCOVILL CONTINUOUS-CAST BRASS STRIP brings to fabricators greatest inherent soundness and uniformity...

Commemorating 150 years of craftsmanship in metals – Scovill presents in action its early hand method for brass bar casting, compared to its continuous-casting process of today.

Compare brass bar casting methods of 1802 and 1952 at Scovill's exhibit in the National Metal Exposition

To commemorate 150 uninterrupted years of craftsmanship in metals, the Brass Mill Products Division of Scovill Manufacturing Company is presenting, in action, its early hand methods for melting and casting the first brass bars made in America, contrasted to its present-day continuous-casting process.

Here, you will see a huge coil of Scovill brass, constantly winding and unwinding before your eyes. You can inspect both sides of this ever-moving strip and see what is meant by inherent *soundness* and *uniformity*. You will see why the last pound of your order for Scovill continuous-cast brass is essentially the same as the first pound.

At Scovill's exhibit you will learn why "*You can't buy better brass!*"

Visit Scovill's Booth No. 1685, National Metal Exposition, Commercial Museum, Philadelphia, October 20-24.

"You Can't Buy Better Brass"

Brass Mill Products in a Comprehensive Range of Commercial Alloys, Shapes, Tempers and Sizes

CONTINUOUS-CAST SPECIALTIES

Brass Strip and Sheet *(Copper-Zinc Series)*

High Speed Brass Rod *(Free-Cutting)*

Extruded Cold-Heading Wire *(Cartridge Brass, 70%)*

Phosphorized Admiralty Condenser Tube

Standard Forging Brass *(Alloy No. 284)*

1802—Early Scovill craftsmen employed these hand methods for melting and casting first brass bars used in this country for subsequent cold-rolling into strip form. Output of these tiny brass bars, weighing 1 lb each, was only about 5 to 10 lbs. hourly.

1952—Today Scovill's unique continuous-casting process is capable of producing up to 30,000 lbs. per hour of rectangular-shaped brass bars. The Scovill flat-metal continuous-casting machine, only one of its kind in the brass industry, will be represented at the Exposition by a half size model—operating in natural color in motion. Since 1949, Scovill has offered commercially 2,000 lb. non-welded 24 in. wide brass coils; 3,000 lb. coils will be available in the near future.

SCOVILL MANUFACTURING COMPANY, 83 MILL STREET, WATERBURY 20, CONNECTICUT

"Tycol Armitage boosts bearing life... smooths the way for faster, heavier loads"

Of course! Tycol Armitage Bearing Grease "stays put" ... keeps anti-friction bearings running smooth and cool. Its high stability makes it suitable for sealed anti-friction bearings that must last the life of the equipment.

Tycol Armitage possesses exceptional resistance to oxidation.

The dependable lubricating ability of this quality grease lengthens bearing life and cuts down maintenance costs.

Call your nearest Tide Water Associated office for further information.

TYCOL

INDUSTRIAL LUBRICANTS

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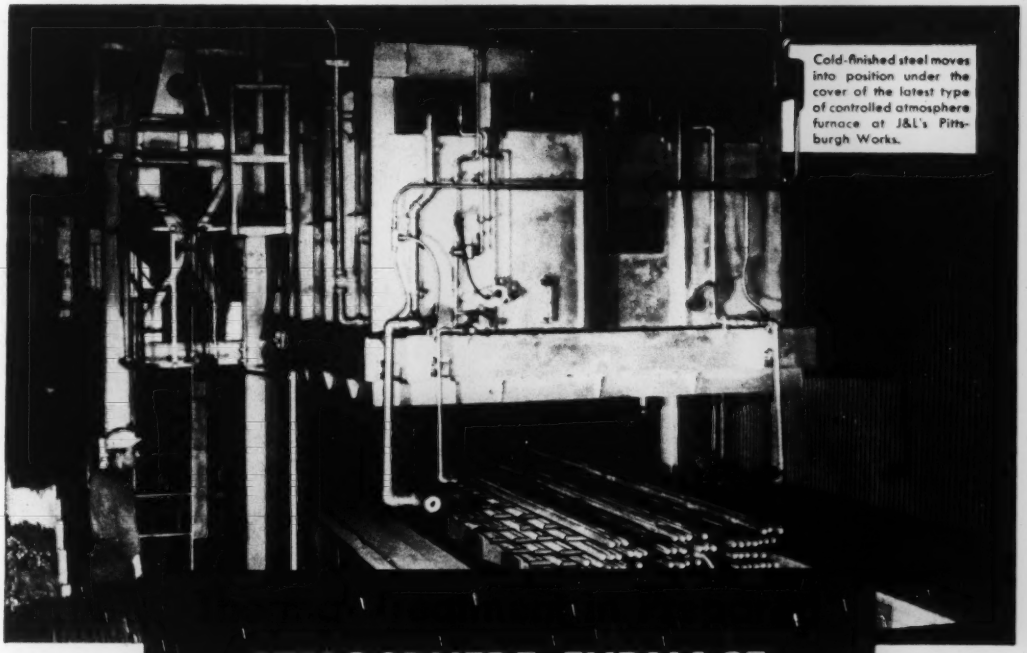
TIDE WATER ASSOCIATED OIL COMPANY

17 BATTERY PLACE · NEW YORK 4, N. Y.

SEND FOR A FREE COPY OF "TIDE WATER ASSOCIATED LUBRICANIA"

Let J&L CARBON RESTORED Cold Finished Bars cut your production costs



Cold-finished steel moves into position under the cover of the latest type of controlled atmosphere furnace at J&L's Pittsburgh Works.

ATMOSPHERE FURNACE

Why incur the cost of removing "decarbed" surface from parts requiring high surface hardness? To eliminate these costs and lower your unit production cost, simply order J&L Cold-Finished Carbon Restored Bars.

This furnace is designed to permit other thermal treatments, such as annealing, normalizing, stress relieving and strain drawing. These treatments can be employed to improve machinability or to meet desired mechanical properties.

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH 30, PA.

J&L STEEL

Jones & Laughlin Steel Corporation
404 Gateway Center, Pittsburgh 30, Pa.

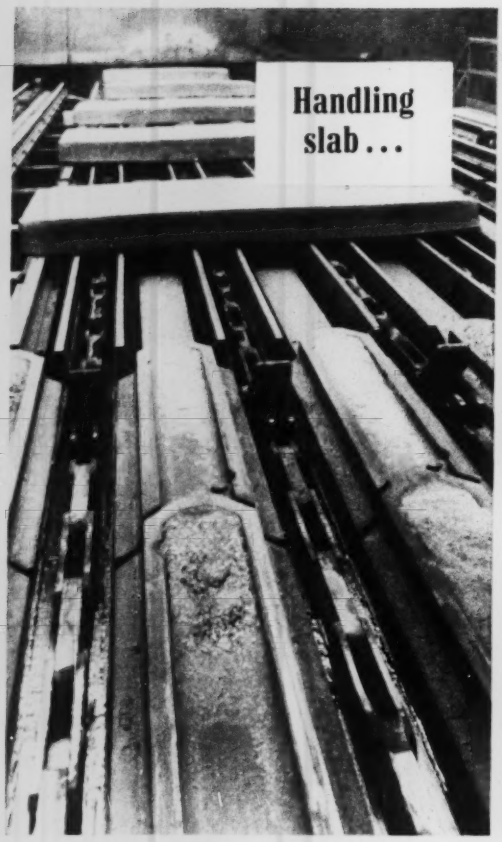
☐ Without obligation please send me your booklet "Extra Services to Users of Cold Finished Steel."
☐ Please have your representative call.

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____



Link-Belt Chains and Sprockets move 8,000 lb slabs at 60 ft. per min. along a transfer table. Slab temperatures as high as 1800° F are often reached.

At this mill, scrap is handled on a mechanized Link-Belt system. By reducing crane and vehicle movements in the vicinity of crews, safety is improved.

LINK-BELT conveyors help cut costs in steel production...every step of the way

IN MILLS all over the country, Link-Belt conveying systems provide important savings in the making of steel. Along every step of the way—from mine to finished product—this fast, safe, economical transportation reduces scrap losses, increases yield.

Slab and scrap handling are but two of the instances in which Link-Belt equipment increases yield and cuts production costs. Link-Belt conveyors offer similar economies for moving coils weighing up to 75,000 lbs. . . . for raw bulk materials, rods, billets, plates, pipe.

Link-Belt engineers will work with your own engineers, consultants and builders of mill and process equipment. Together, they can give you a conveying system built to your exact requirements.

LINK-BELT

MATERIALS HANDLING, PROCESSING & POWER TRANSMISSION MACHINERY

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa), Sydney (Australia). Offices in Principal Cities. 12.86

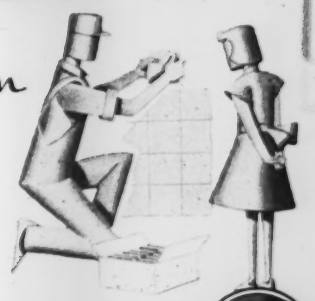
Beauty Treatment for Your bathroom

Bet you can't guess how little it would cost to make *your* bathroom as pretty and practical as this one.

That is, unless you already know about steel wall tile. How smart it looks. How it protects the beauty it adds. How reasonable it is to purchase and install. Because all the wall tile in this delightful room is made of steel, America's great and versatile bargain metal.

Even better for your bathroom, this wall tile is made of *Weirzin*—the electrolytically zinc-coated steel that is fireproof . . . resists moisture . . . forms a lasting bond with its finish . . . safeguards beauty permanently.

It doesn't matter whether it's wall tile or lighting fixtures, Venetian blinds or cabinets—whatever you buy, you come out ahead with steel. Make steel *your* standard—and save.



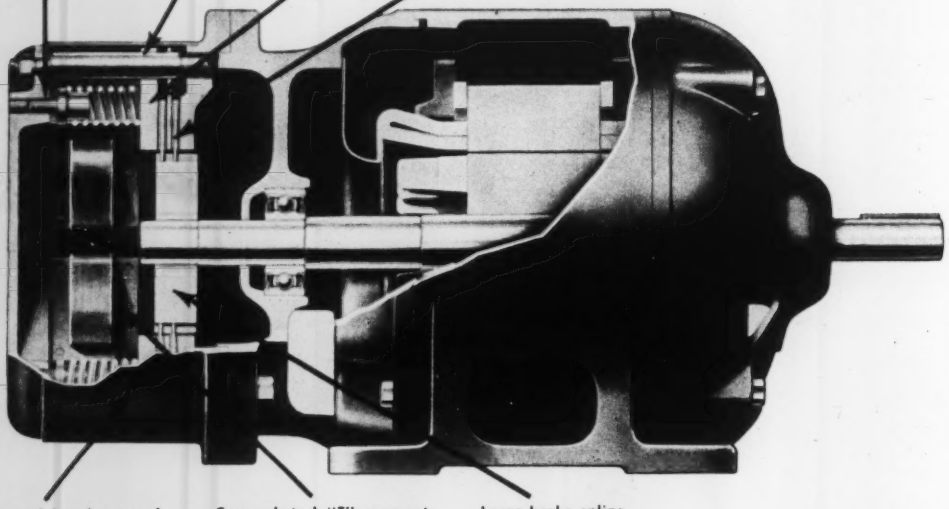
Metal sculpture executed in Weirzin demonstrates the exceptional workability of this easily fabricated metal.

WEIRTON STEEL COMPANY

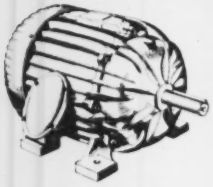
WEIRTON STEEL COMPANY WEIRTON, WEST VIRGINIA

NATIONAL STEEL CORPORATION

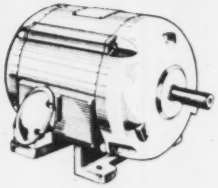
Here's a


Oversize brake studs absorb torque.
Magnet armature plate.
Readily accessible torque adjusting screws.
All-metal brake disc.
Wrap-around band cover, for totally-enclosed protection and easy removal.
Core plated "E" magnets. Readily accessible. Location keeps heat away from motor.
Large brake spline with many teeth.

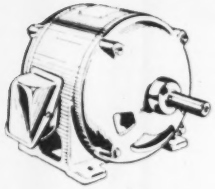
Other ELLIOTT C-W motors for special and general use . . .



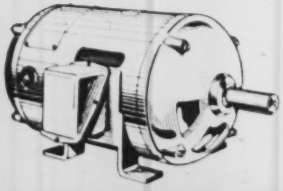
TYPE CFC
Squirrel cage, "Sealed Power," Totally-Enclosed, Fan-cooled



TYPE BE
Squirrel cage, Totally-Enclosed, Non-Ventilated



TYPE BA
Squirrel cage, open-drip-proof (protected)



TYPE BW
Wound rotor, Open-drip-proof (protected)

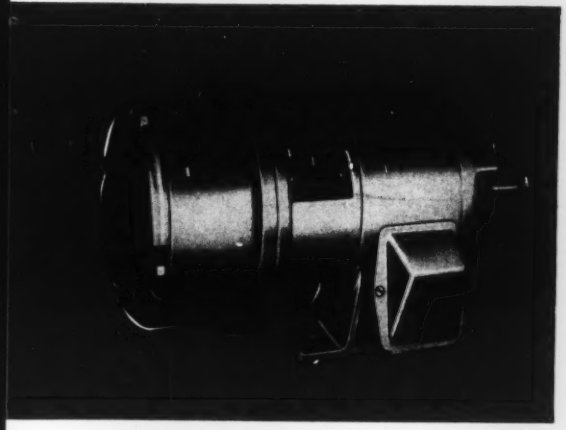
ELLIOTT COMPANY

brake that can take it!

The Elliott CROCKER-WHEELER BRAKE MOTOR

QUICK STOPS AND STARTS are taken in every day stride by this rugged brake motor. Its all-metal *bonded* brake linings dissipate heat faster, wear longer and are immune to dampness, cold and other "brake killers." In performance, the powerful magnetic braking action is instantaneous—and sure.

Moreover, the Elliott C-W brake is tops in compactness and adaptability. It can be mounted on double shaft extension NEMA standard D flange or C face motors without the need of mounting brackets or adapters. Teamed with an efficient Elliott C-W motor (protected or totally-enclosed types), it's a combination that's hard to match.



The Elliott C-W Brake-Motor. Note the simple, wrap-around cover on the brake to give totally-enclosed protection.

SEND FOR THIS BULLETIN

It gives you all the details of construction and applications. Ask for BRAKE MOTOR BULLETIN SL-610-1 and address your request to Elliott Co., Dept. S, Jeannette, Pa.

ELLIOTT C-W motors range from 1 to 200 hp. Large ELLIOTT motors and generators are built by the RIDGWAY DIVISION in Ridgway, Pa.

CW-23

Do up to 80% of your

STANDARD CARBOLOY TOOL PRODUCTION TIPS

1. A large radio manufacturer solved several of its trickiest, toughest automatic screw-machine problems by ignoring accepted practices and switching from steel tools to cemented carbide tools. First, a modified Standard Carboloy Tool (Grade 883 carbide tip) is used to turn B-1113 steel. Finish and accuracy are exceptional —*and tool life is extended to 50 to 60 hours of continuous production.*

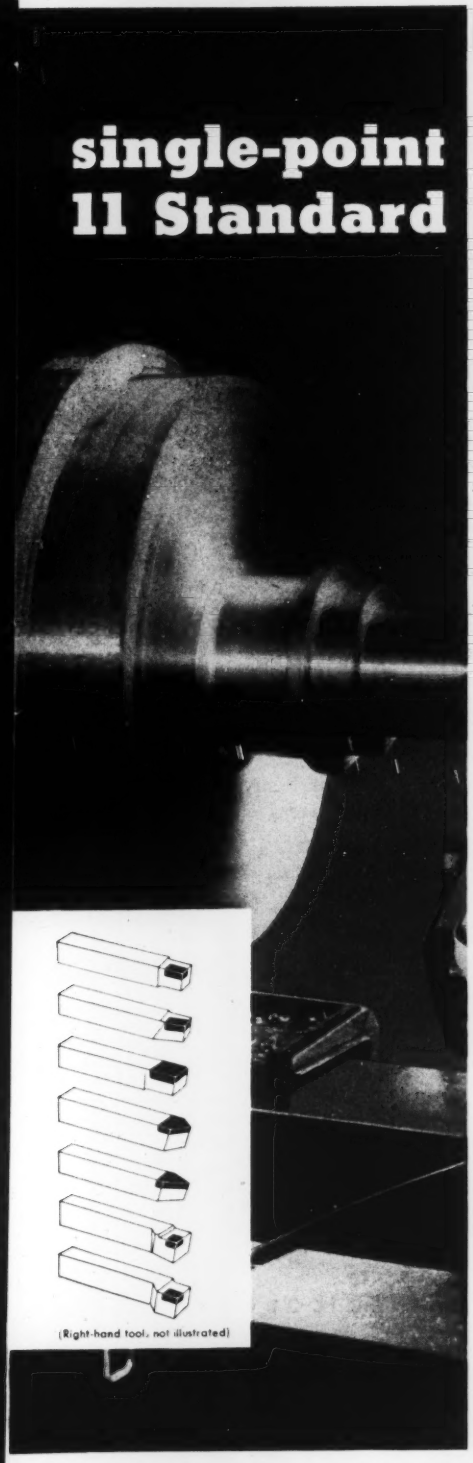
Second, high-speed steel tools failed completely on the cut-off job when positions were decreased from 3 to 2, and feed was increased from .0024" to .0037". Again breaking with tradition, this manufacturer cuts the B-1113 steel to dead center with Standard Carboloy Tools using Grade 883 tips.

2. A large motor-car company now performs nine roughing operations simultaneously on a $13\frac{1}{2}$" O.D. cast aluminum converter pump with a special tool head incorporating modified Standard Carboloy Tools. The operation consists of 9 cuts — 3 facing, one boring, 3 combined boring and facing cuts, and 2 combination facing and chamfering cuts.

Total feed is .012" per revolution. Cutting speeds range as high as 3400 SFPM, spindle speed 800 rpm. *Output per machine per hour is tripled.*

If these cemented carbide applications suggest Standard Carboloy Tool uses you would like to explore further, please get in touch with your Carboloy representative.

single-point machining with 11 Standard Carboloy Tools



(Right-hand tool, not illustrated)

11 Standard Carboloy Tools will do up to 80% of all your single-point turning, facing and boring . . . eliminate hundreds of costly, inventory-loading special tools.

What's more, fast-cutting Standard Carboloy Tools boost production as they chop tool and maintenance costs. *This has been proven in all types of shops on an industry-wide basis.* Tipped with the quality brand of cemented carbides, Standard Carboloy Tools easily outproduce and outlast steel tools by as much as 10 to 1 or more.

Cut faster, better, for less

Why not test Standard Carboloy Tools on your toughest job? Prove for yourself that whether used "as is" or quickly and economically ground to special shapes in your own toolroom, Standard Carboloy Tools will do your single-point machining jobs faster, better, for less.

And don't overlook the plus-values in Standard Carboloy Blanks. They're available in many styles; mass-produced at low cost in hundreds of sizes. They're easily brazed to tool shanks to handle those emergency jobs, without time or money wasted waiting for specials.

Extra carbide benefits

Carboloy-Developed Services lead to more efficient selection, design, use and maintenance of cemented carbide tools, result in *extra* carbide benefits. Services include Customer Training School, technical manuals, charts, catalogs, low-cost slide films . . . and on-the-job assistance of skilled Carboloy engineers to crack specific carbide problems.

Write for complete Carboloy General Tool Catalog, GT-250, or contact your local Carboloy Sales Engineer or Authorized Distributor today.

"Carboloy" is the trademark for the products of Carboloy Department of General Electric Company

CARBOLOY

DEPARTMENT OF GENERAL ELECTRIC COMPANY

11141 E. 8 Mile Ave., Detroit 32, Michigan

Plants at Detroit, Michigan; Edmore, Michigan; and Schenectady, N.Y.

NOTE:

Magnet ideas to speed up general shopwork

See how Carboloy Permanent Magnet Sheet-Steel Separators prevent feeding of doubles. How permanent magnets give an extra "hand" in general shop work, including . . . magnetic stands, tool-holding devices, sweepers' pick-up tools, magnetic paper grippers on machines, containers for small parts and magnetic retrievers. (Write for Carboloy Magnet Ideas Kit, PM-102.)

If it's tough to pack it...**DRUMPAK** it!

For Example...

More than one third of a million Maytag Automatic Washers have been packed and shipped in DRUMPAK Heavy-Duty Containers during the past two years. If you ship appliances and have the problem of protecting porcelain, investigate DRUMPAK.

U. S. Patent 2,214,220
Other Patents Pending

The DRUMPAK Heavy-Duty Container — Tailored to Fit Your Product — Gives You These Protection Features:

EXTRA RUGGED STRENGTH — in DRUMPAK's end-reinforced design and tough, resilient materials.

CUSTOM-FITTED — to practically any size or shape of product, to meet all shipping conditions.

SPACE-SAVING — DRUMPAK comes to you knocked-down-flat for easy storage — ready to assemble in seconds.

MOISTURE-PROOFED — liners are available, also sift-proofed seals for powdered products.

VERSATILE — DRUMPAK is solving packing problems for such diversified products as nails, sandpaper, stitching wire, rope, plastic sheeting, rubber hose, television sets and other major appliances.

For more information write for a DRUMPAK brochure containing complete details.

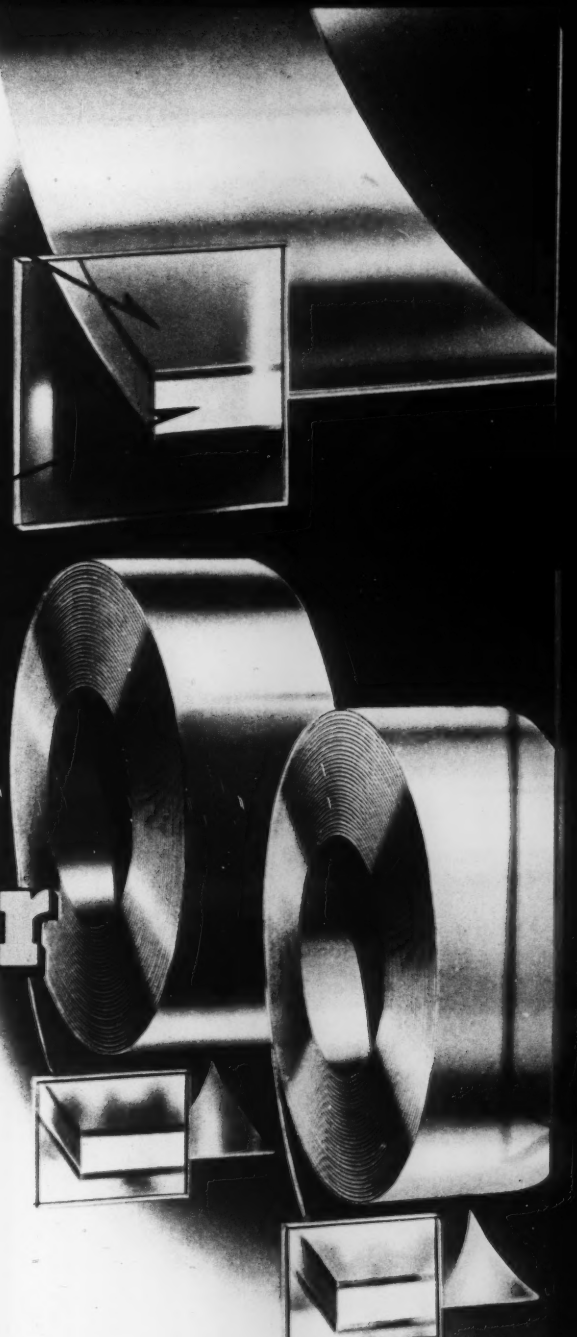
Gaylord Boxes

- **Corrugated and Solid Fibre Boxes**
- **Kraft Paper and Specialties**
- **Kraft Bags and Sacks**
- **Folding Cartons**

GAYLORD CONTAINER CORPORATION

General Offices: ST. LOUIS • *Branches:* New York • Chicago • San Francisco • Atlanta • New Orleans Jersey City • Indianapolis • Los Angeles • Seattle • Houston • Oakland • Minneapolis • Detroit Columbus • Fort Worth • Tampa • Dallas • St. Louis • Cincinnati • Des Moines • Oklahoma City Portland • Greenville • San Antonio • Memphis • Kansas City • Bogalusa • Chattanooga Milwaukee • Weslaco • New Haven • Amarillo • Appleton • Hickory • Sumter • Greensboro Jackson • Miami • Omaha • Mobile • Philadelphia • Little Rock • Charlotte • Cleveland

All copper
(or brass)
where you
need it-
-and steel
where steel
serves best



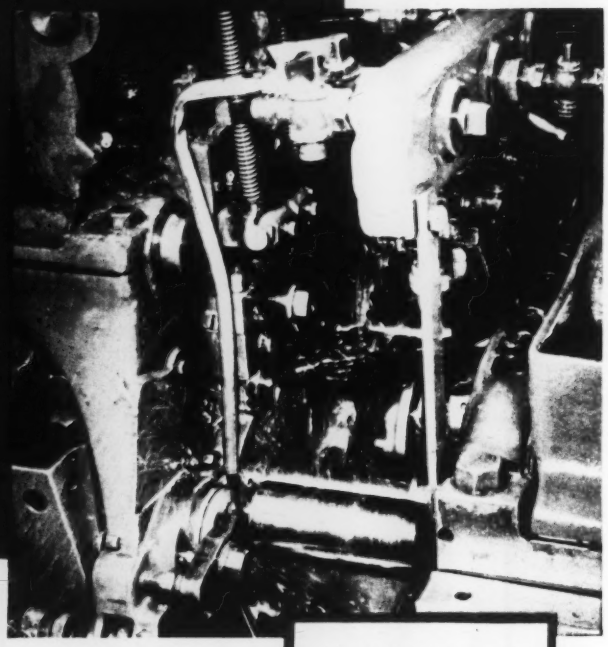
SuVeneer®

CLAD METALS

SuVeneer Clad Metals give you *surfaces* of genuine solid copper or brass, to do the jobs for which you ordinarily specify these materials . . . with the big new plus of *steel* for greater strength, twice the elasticity, and lighter weight, than either copper or brass used alone. • You save critical metals for defense—you benefit your products' performance—when you specify time-proved **SuVeneer** Clad Metals. *Let us work with you!*

Superior Steel
CORPORATION
CARNEGIE, PENNSYLVANIA

TOOL LIFE UP 20%



Job: Machining plunger pins for M48A3 fuse
Machine: Davenport Automatic
Metal: #416 stainless steel
Coolant: Texaco Cleartex Oil AX

...when manufacturer changes to TEXACO CLEARTEX OIL

Buchmann Spark Wheel Co., manufacturer of screw machine parts, Long Island City, N. Y., wasn't satisfied with the way a competitive cutting oil was performing on this job of machining stainless steel. Tool life was short, finish not all it should be. So they called in a Texaco Lubrication Engineer who recommended *Texaco Cleartex Oil*.

Improvement was noted immediately. Finish was much superior and tool life was increased some 20%.

Texaco Cleartex Oil is just one of a complete line of Texaco Cutting, Grinding and Soluble Oils designed to help you do *all* your machining better, faster, and at lower cost. A Texaco Lubrication Engineer will gladly help you get these results whatever the metal you are working or your method of machining it.

Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO CUTTING, GRINDING AND SOLUBLE OILS FOR FASTER MACHINING

Faithfully yours 50 *for Fifty Years*

TUNE IN Tuesday nights on television the TEXACO STAR THEATER starring MILTON BERLE. See newspaper for time and station.

October 6, 1952

Price Pass-Through: 2 Per Cent

Industry's indignation is mounting at the niggardly price rise permitted by OPS' formula to pass through higher steel, copper and aluminum costs. As predicted by this publication two weeks ago, the formula permits only an average 2 per cent price rise since it takes no account of any increase in labor or other operating costs. Lamson & Sessions Co., fastener manufacturer, finds that the price increase on its steel and aluminum products averages 2.24 per cent and says, "This is an injustice." Oliver Iron & Steel Corp. figures its average price rises on fasteners will be 2.41 per cent and says, "The industry has been unfairly dealt with." Westinghouse Electric Corp. says the pass-through allows a boost of only 1.3 per cent on its transformers.

No Balk Expected

Wage Stabilization Board wasn't expected to balk seriously at giving the Northern and Southern coal miners the $1.90 daily increase negotiated for them by Mr. Lewis. Soft coal operators all over the country have already started raising prices but few of them have to get OPS permission because most coal has been selling about 60 cents a ton below ceiling. Increases average 30 cents a ton.

Postponed One Month

Relaxation of construction controls, originally promised for next Apr. 1, has been postponed until May 1 "because of the steel strike." Some six orders are coming out now to make the change. Most of them are not effective until May.

Military Output Rises

Just what effect did the steel strike have? On the military program, surprisingly little. In the third quarter deliveries in all military procurement and construction programs are estimated to be slightly over the $7.7 billion total of the April-June quarter. Deliveries on planes, tanks, guns, ammunition and other military hard goods is now about $2 billion a month, three-fourths of the rate toward which the present schedules are directed. Deliveries of all types of military procurement and construction is about $2.7 billion a month. Of the $129 billion appropriated by Congress for the military since Korea, $41 billion has been delivered, $60 billion more is on order and contracts covering most of the remaining $28 billion will be let in the next nine months.

Turnabout In Aircraft Output

Jet engine output, once the bottleneck in aircraft production, has improved so markedly that by early next year it could be outpacing airframe assemblies. The improved situation has helped make it possible to increase the output of F-84s and F-86s from 55 to 250 a month. To increase airframe assemblies, more subcontracting may be in the works, especially with smaller business. Air Force contracts

Production-Engineering News—p. 75 The Market Outlook—p. 139

and purchase orders with small business in fiscal 1953 should exceed $680 million, the total reached in fiscal 1952.

More Aluminum for the Troops

The military requirements for aluminum have increased greatly, especially on equipment that would be carried by troops. The change from steel to the lighter metal has been gradual and more shifts are coming. That situation lies behind the government's anxiety for another round of aluminum expansion (p. 48). The current round isn't even finished yet, because of the steel strike. The delay, plus power shortages, may cut aluminum output some 120 million pounds short of what it was expected to be for the last four months of 1952.

Road Clear for Highway Machinery

Expect a big year for road machinery builders in 1953. Construction of more turnpikes and the extension of present ones will create a heavy demand. So will the fact that the use of federal-aid road construction funds in 1953 will be at a rate higher than ever before.

New Nash Car Next Year

Late next year Nash will start marketing in this country a larger version of its NXI, the miniature car that was shown for public reaction in 1950. It will be built in England by Austin and Fisher & Ludlow. The vehicle will have an 86-inch wheelbase and a 42-hp engine.

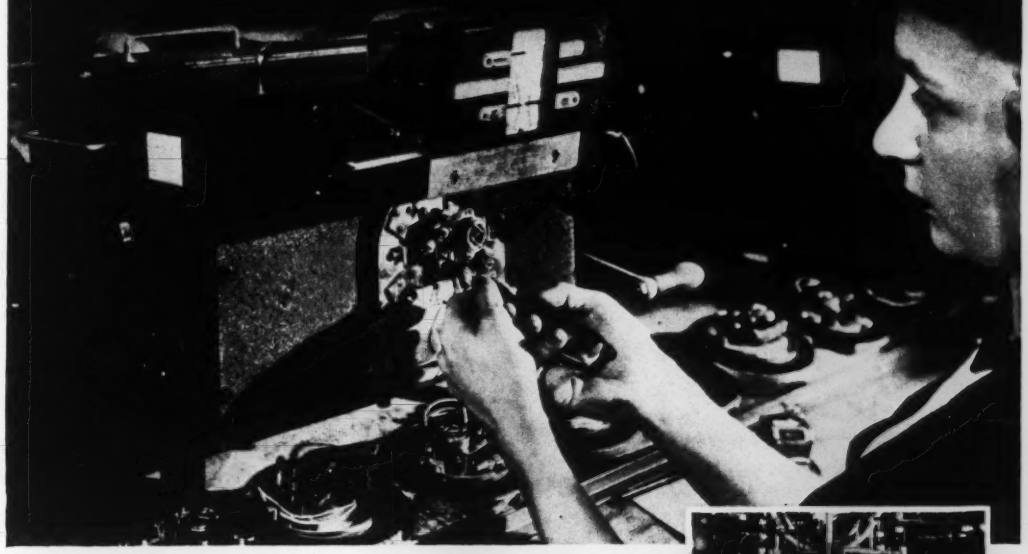
Straws in the Wind

The tight situation in larger sizes of quality steel bars will persist until the middle of next year . . . Iron and steel companies' $1.2 billion federal tax in 1951 was nearly enough to support four federal departments in fiscal 1950 . . . Ralph Trigg has been named senior deputy administrator for DPA and will run that agency for Defense Mobilizer Henry Fowler . . . Eleven changes in Order M-25 on cans will allow greater freedom in the use of tinplate and will eliminate controls on terneplate for cans . . . OPS authorizes firms selling on a delivered price basis to boost ceiling to reflect higher outbound transportation costs incurred since July 26, 1951.

What Industry Is Doing

The aircraft production program will go along on schedule, despite criticism by a Senate investigating committee and the Aircraft Production Board (p. 47) . . . It's undesirable to end the Controlled Materials Plan earlier than July 1, 1953, says Defense Mobilizer Fowler (p. 48) . . . Structural steel will be available for work already started and a few new jobs in the first quarter, 1953 (p. 49) . . . Capital outlays on new facilities may continue at a norm of $20 billion a year for the rest of the decade, say metalworking executives (p. 50) . . . Transmission chain output still has weak and missing links, but supplies are better than a year ago (p. 51) . . . Iron and steel expansion is matched by improved production techniques and better quality, as shown at the Association of Iron & Steel Engineers' convention (p. 52) . . . Packaging engineers are cutting shipment costs by designing containers to fit industry's products (p. 57).

PUTTING *Air* TO WORK FOR WESTERN ELECTRIC



She's adjusting a telephone dial mechanism, surrounded by an invisible dirt barrier of controlled air.

AIR CONTROL

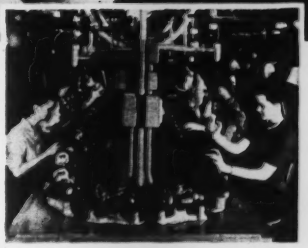
PUTS PRECISION IN YOUR TELEPHONE

If you make a precision product, and mass-produce it, you can't tolerate airborne dirt. That's why Western Electric takes special pains to banish dirt and grit when they make your telephone sets. And they do it in a very simple way. They use *air*.

Throughout their huge Indianapolis plant a positive air pressure is maintained—just slightly higher than normal outside atmosphere. This sets up an outward air movement which specks of dirt just can't buck. Result: air keeps dirt out, instead of carrying it in!

32 big Westinghouse fans furnish a constant supply of filtered air 24 hours a day, every day. Because of their high efficiency, they operate at a low power cost. That's important, for at peak capacity these fans move 2,300,000 cubic feet of air per minute.

You can *put air to work* in many ways to improve your own operations. Our trained engineers are ready to help you. And Westinghouse makes the most complete line of air handling, air conditioning and air cleaning equipment. Ask for General Catalog 600 which describes these products and their many uses. Contact your local Westinghouse-Sturtevant office, or write Westinghouse Electric Corp., Sturtevant Division, Hyde Park, Boston 36, Mass.



No dirt means greater precision, fewer rejects, healthier conditions, when controlled air teams up with mass production.

32 efficient Westinghouse fans provide ventilation and keep dirt out. Because of their non-overloading blade design, motor burnouts are not a problem.

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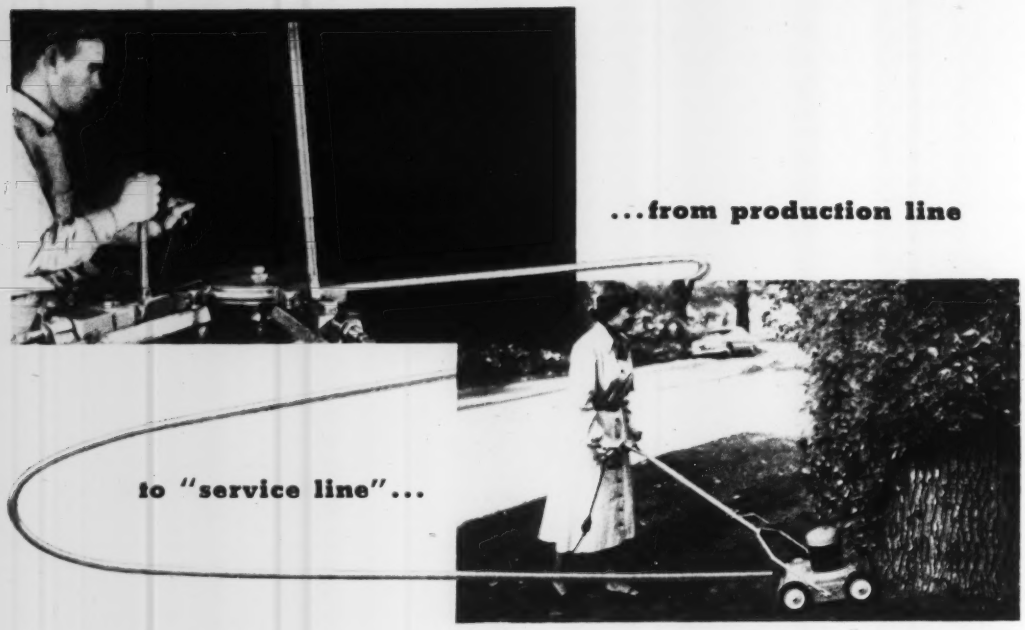
TUNE IN ON HISTORY! Only Westinghouse brings you complete coverage of political campaign over CBS television and radio.

AIR HANDLING



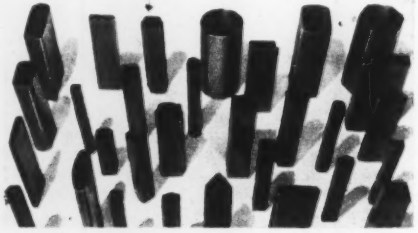
Armco Steel Tubing moves your products faster

To cut your shop costs . . . to give your products that extra "sales" appeal, look into Armco Welded Steel Tubing.

Used in place of angles and other solid sections, Armco Tubing simplifies design and speeds production. And its smooth surface makes your products more modern and attractive — more salable.

Tubular parts mean your products are stronger and lighter in service, too. Loaded as a beam, Armco Welded Tubing has less than one-fifth the deflection with the same amount of steel. And as a column, it offers more than five times the load-carrying capacity with the same amount of steel.

Armco Welded Steel Tubing comes in a variety of made-to-order shapes in Hot-Rolled or Cold-Rolled Steel; in ALUMINIZED (an aluminum-coated steel) and in ZINCGRIP (a specially zinc-coated steel). Our Tubing Specialists will help you select the *right kind* of tubing for your products. Write for further information.



These are some of the standard and special shapes of Armco Welded Steel Tubing. With either standard or special shapes, you can reduce fabrication time and costs, give your products a more substantial look.

ARMCO STEEL CORPORATION

MIDDLETOWN, OHIO, WITH PLANTS AND SALES OFFICES FROM COAST TO COAST
THE ARMCO INTERNATIONAL CORPORATION, WORLD-WIDE

ARMCO

The Real Threat

In the frequent discussions held throughout the country on the problems of smaller manufacturers, the question often is raised as to whether the long-range effect of technologic and economic progress expands or diminishes opportunities for smaller-size companies.

We know from experience that such progress at times does shut the door of opportunity to small operators. Forty years ago one could go into the sheet business with a few hand mills representing a moderate capital investment. Development of the continuous mill and other circumstances have transformed the manufacture of strip and sheet steel into "big business," requiring a substantial investment.

On the other hand, the availability of sheet and strip in a wide variety of gages, widths and lengths has opened up new opportunities for small manufacturers in processing, shaping and fabricating flat rolled steel. A thoroughgoing study of other branches of the metalworking industry probably would show that for every instance where progress has narrowed opportunities for small entrepreneurs, there have been offsetting instances where such opportunities have been broadened. Certainly the fact that the number of metalworking companies employing 20 or fewer persons increased from 16,853 in 1939 to 35,250 in 1950 does not indicate a shrinkage of opportunity for firms that size.

Will this continue to be true in the future? One way to answer this question is to ask ourselves if there are any trends in the newer developments in metalworking which are likely to affect small business adversely. To date, in the important new activities in jet propulsion, small companies have shared liberally with large companies in supplying materials, components and equipment. In the atomic energy field, while giant corporations of necessity play an important role, the extent to which they have and are relying upon thousands of small companies for equipment, parts and supplies seems to insure a promising market for small business.

In short, small manufacturers have less to fear from the effects of technologic and economic progress than from the strangling influence of excessive government regulation and oppressive federal taxes. These latter are the real threats to small business.

E. C. Shaner
EDITOR-IN-CHIEF

ONE GIVES, ONE TAKES: Many persons, aware of the inefficiency of government in business, have wondered what would happen if certain activities in Washington were turned over to privately-owned corporations for operation. For instance (p. 54), would the public be better off if the United States postal service were run by one of several competent private companies?

The Council of State Chambers of Commerce

has a convincing answer to this question. It points out that in fiscal 1951 the gross receipts of the Post Office Department were $2,320,327,570, which includes more than half a billion dollars of taxpayers' money paid by the United States Treasury to make up the postal deficit. In the same period the privately-owned Bell Telephone System received gross revenues of $3,639,462,365, from which it earned a net of $435,591,119 after paying out $629,559,000 in federal, state and local taxes. Also Bell collected $571,123,801 for Uncle Sam in excise taxes from telephone users.

Bell, providing excellent service, puts $1,200,682,801 into the national kitty. Uncle Sam's Post Office Department, providing mediocre service, nicks it for half a billion.

* * *

NEW RECORDS ARE DUE: Since the first week of September activity in many basic lines of the metalworking industry has been mounting rapidly. This publication's index of industrial activity (p. 65) stands at 230 per cent of the 1935-1939 average. This is the highest point reached in more than two years. It reflects gratifying performance in the last two weeks in steel ingot output, automobile production, electric power generation and revenue freight car loadings. Steel ingot output was at a new all-time high in the week ending Sept. 27. October is bound to witness new all-time records in steelmaking and electric power output and new highs for 1952 in automobile assemblies and car loadings.

STEEL LOOKS AHEAD: Many of the 10,000 persons who attended the convention and exposition of the Association of Iron and Steel Engineers in Cleveland last week were impressed by abundant evidence that the current marked expansion in iron and steel capacity is being matched by equally noteworthy advances in engineering and in operating techniques.

Displays in the show and discussions in the technical sessions (pp. 52, 102) reflected strong trends toward more automatic controls and greater attention to economy through improved methods of handling materials. Also noticeable was a tendency to think in terms of possible applications of new processes in the future. Some iron and steel equipment men actually are trying to visualize what the availability of atomic energy will mean in the redesign of their products.

These and other features lent to the 1952 show and convention an atmosphere of forward-looking alertness and progressiveness that augurs well for the iron and steel industry.

* * *

A WAY TO SAVE MONEY: Packaging is being recognized as an ignored or neglected phase of managerial attention in metalworking establishments. Expensive talent has been devoted to the design and construction of a product or machine, and then—when it is ready to be shipped to the customer—the job of boxing or crating it has been left to the mercies of persons who, conscientious or otherwise, have had little experience or training in the all-important technique of efficient packaging.

Numerous companies, large and small (p. 57) are learning that expert advice on crating and boxing problems pays handsome dividends. Companies whose packaging costs have been unduly high have saved tens of thousands of dollars annually by following the advice of experts. If packaging is important in the shipping of your product, you will do well to enlist the counsel of men experienced in this field. It will save you money.

* * *

NON-METALLIC BODIES? For several decades resourceful leaders in the automobile industry have dreamed of substituting nonmetallic materials for iron and steel. Henry Ford was enthusiastic about its possibilities and pushed it aggressively. More recently, almost every automobile manufacturer has been keeping an eye on the development of plastics. This material has gained entry into motordom for certain not too important applications, but its proponents seem to think that in due time it may be accepted for use in automobile bodies.

Until six months ago, most auto executives viewed the development of nonmetallic laminates for bodies as something that would drag on for years. Apparently progress has been more rapid than expected (p. 61), because today a few cars with plastic bodies are being built and several automobile manufacturers are considering the introduction of such bodies in new models on an experimental basis. The currently popular "sports" roadsters may be the guinea pigs for the testing of laminated plastic body material.

NEED METAL STAMPINGS?

Firestone is Geared to Handle Your Needs Speedily and at Low Cost to You!

IN SETTING up a metal stamping contract, Firestone thoroughly analyzes the manufacturing procedure to reduce every controllable cost factor to the minimum. This includes the coordination and integration of new automatic stamping machines and heavy tonnage presses (like those shown here) with heat treating, welding, bonderizing, assembly and finishing. Modern, efficient assembly lines reduce handling and production costs and turn out your work ON SCHEDULE.

For a complete cost analysis on stainless steel, carbon steel or aluminum stampings and sub-assemblies write today to Firestone Steel Products Company, Metal Stampings Division, Akron 1, Ohio.

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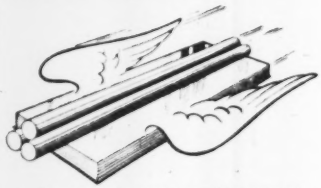
Which of these special-purpose steels do you need...*NOW?*

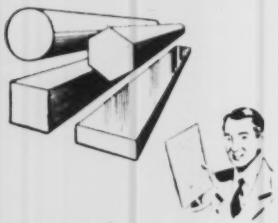
Call Ryerson for Quick Shipment

Right now, users of special purpose steels can get most of their requirements quickly—with one call to one convenient source. All the steels described on this page are in better-than-average supply at the Ryerson plant near you. All are high quality steels that conform to exacting specifications. Use this page to check the items *you* need, and save time by ordering them next time you call Ryerson.



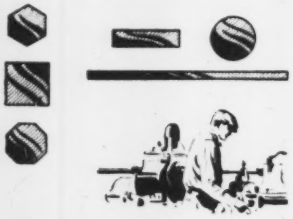
AIRCRAFT ALLOYS AND STAINLESS

Alloy bars, sheets and strip in more than 400 sizes, finishes, conditions. Stainless in more than 300, to meet all important aircraft specs.



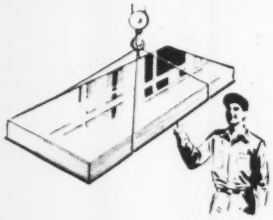
STANDARD ALLOYS

Rounds, flats, hex's, squares—hot rolled and cold finished—complete heat treatment guide with each shipment.



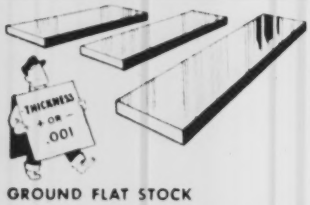
TOOL STEEL

Water, oil or air hardening tool steels. High in quality, economical in price. Hardening data with every shipment.



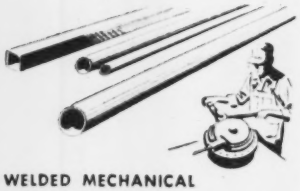
STRAIGHT CHROME STAINLESS

No allotment required for these stainless bars, plates and sheets. Can often replace restricted nickel-chrome types.



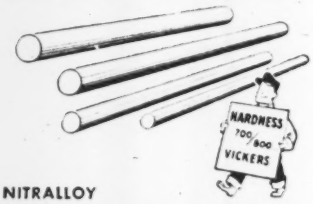
GROUND FLAT STOCK

High grade, non-deforming tool steel. Saves machining, speeds production. For accurate to size parts, tools, dies.



WELDED MECHANICAL TUBING

Hot and cold rolled, rounds and squares in a wide range of sizes. Consider cost—substitute for seamless tubing.



NITRALLOY

Develops extremely high surface hardness after nitriding. Unequalled for parts subject to abrasion. Large stocks.

OTHER PRODUCTS: CARBON STEEL BARS, STRUCTURALS, PLATES, SHEETS, ETC.

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT NEW YORK • BOSTON • PHILADELPHIA • CINCINNATI • CLEVELAND • DETROIT
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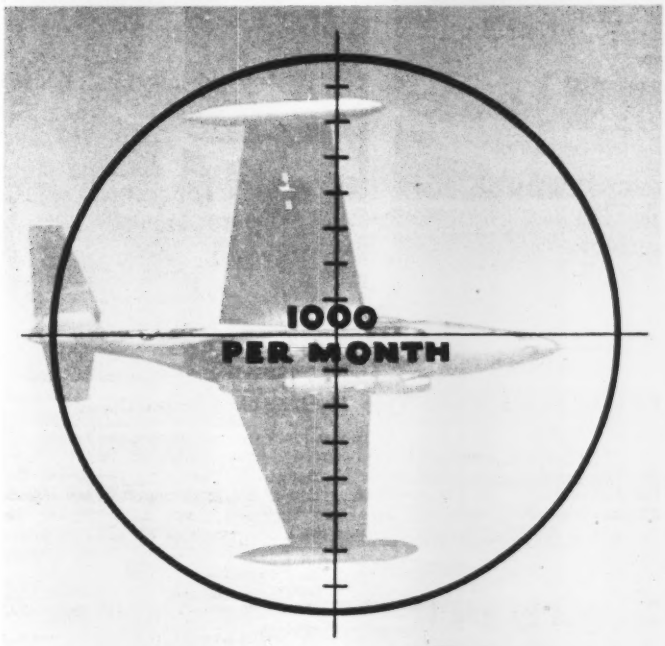
Quality not Quantity . . .



Peak Plane Output by December

The issue of quality vs. quantity in aircraft production has been decided in favor of the former. So, a level output of about 1000-1100 a month will be reached by yearend

THE MILITARY aircraft production program will go along as scheduled despite criticism of the planning by a Senate investigating committee and the acting chairman of the Aircraft Production Board.

The first round in the battle of quality vs. quantity has been won by the Air Force and the Navy's Bureau of Aeronautics who have long advocated quality first and quantity second unless we get into World War III. The decision means that the production plans issued last July, and called the A-18 Schedule, will stay in effect.

Peak by Christmas?—Although much of the detail of the schedule is classified information, it does call for the aircraft industry to reach its production peak by December when it will be turning out 1000 to 1100 planes per month for the military. Aircraft Industries Association points out that output of airframe weight "will continue to rise for several months after that, as production of some types of liaison and training planes is completed and as deliveries of the heavier fighters and bombers increase."

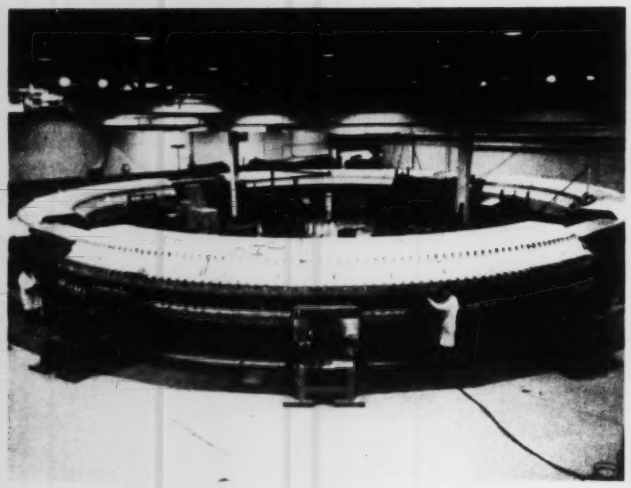
At present the over-all monthly production rate of military planes has increased by more than four times and production of fighters and bombers for the Air Force has been multiplied by five times since the Korean War began. As it looks now, military aircraft output of about 10,000 this year will substantially meet existing schedules. Production goals call for a manufacturing level capable of equipping a 143-wing Air Force and a proportionate Navy air arm by mid-1955.

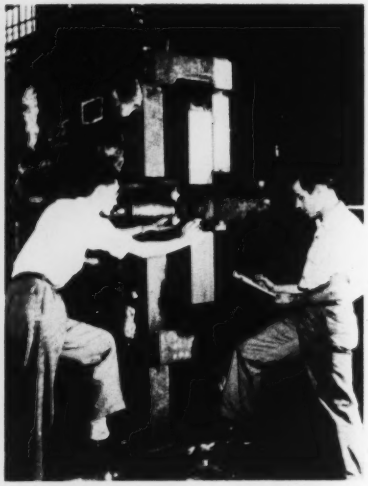
Below the Potential—Adm. DeWitt C. Ramsey, Aircraft Industries Association president, points out that the aircraft industry is not producing as many planes as it could build, nor do the current schedules indicate that it will soon have to produce to the limits of its capacity. That situation is at the heart of the criticism of present planning. The advocates of quality argue that we must have the latest equipment and that we must not freeze models for mass production as the proponents of quantity urge. The quality camp claims we have enough planes for Korea.

The controversial Campbell report, which expresses the quantity camp's views, was submitted to the Aircraft Production Board by its Acting Chairman William L. Campbell. It was highly critical of the number of plane models being made for the services. It recommended that production be concentrated on a few plane types which ought to be mass produced. Creating less bitterness were other recommendations calling for a speed-up in the time between design and procurement, limited engineering changes, a quicker shift from obsolete planes to newer models, a streamlining of inspection services and bigger production goals. The report of the Senate Preparedness Committee chairmanned by Sen. Lyndon Johnson (Dem., Tex.) reiterated the Campbell charges and especially criticized the penchant of the Air Force for "gadgets and gimmicks."

The Reply—Those charges are formally answered in the statement just out by the Air Force in which it made it clear that quality would hold for a while. "The Air Force is not taking any immediate action to change any of its planned production as a result of the Campbell report. This does not mean that at some time in the future the Air Force will not take action in line with the objectives of the Campbell report with which the Air Force is in accord."

Informally, the reaction to the Campbell and Johnson reports has been less moderate in language.





New Atom Smasher Creates Two to Three Billion-Volt Hydrogen Bombardment

In order to speed up the study of high-energy physics scientists and engineers joined forces at Brookhaven National Laboratory to build the cosmotron, an atom smasher of unprecedented energy. Through hydrogen particles with energy of two to three billion electron volts, it will create new particles known as mesons. Because a solid magnet would be far too large and expensive, the cosmotron uses an annular ring-type magnet 75 feet in diameter, left, made by Bethlehem Steel Co., Bethlehem, Pa. It consists of 288 octagonal blocks arranged in four quadrants. At right, two engineers check dimensions of the pole gap in one of the blocks made of 12 half-inch plates

Defense Secretary Robert A. Lovett criticized the attempts of civilians to dictate the planes to be made, unless "they are willing to fly them."

Meaning — What does this all mean to the estimated 60,000 subcontractors to the aircraft industry? On the plus side, it means that the production program is pretty well set for a while and that order cancellations should be infrequent from now on. On the minus side, it means that the production program will not be increased spectacularly from what it now is and that generally the subcontracting setup is nearly all arranged for currently planned models.

But the opportunities for new subcontracting on late models remain good because the advocates for quality are certain from now on to be approving new plane types for which the subcontracting tiers have not yet been established. Such new programs may include subcontracting arrangements for the J-65, the Sapphire jet engine, which is not yet on a production basis, or for all-weather interceptors or helicopters where engineering snags hold up full subcontracting.

Decontrol by July 1?

IT IS impracticable and undesirable to abandon the Controlled Materials Plan before July 1.

So advises Defense Mobilizer Henry H. Fowler in testimony before a congressional committee. "To do so precipitately early next year might interfere with the ability of executive agencies to carry important decisions that Congress may wish to make during the next session concerning the size, scope and character of our future defense effort."

On the Fire—He reveals that a new ferroalloys program, which he did not explain, will be the subject of an ODM order "shortly." He says ferroalloys need an over-all plan, including stockpiling, conservation, exploration and development under subsidies offered by the Defense Materials Procurement Agency.

Also discussed by Mr. Fowler is a third round of aluminum expansion. He says we need 200,000 more tons of domestic production capacity. He asks for firm proposals from would-be producers and promises "in so far as possible" to give the green light to new producers.

Stoking Up — New expansion goal would make total domestic aluminum capacity 1,746,000 short tons by Jan. 1, 1955, up 13 per cent from the previous target of 1,546,000 tons. Domestic production in 1950 was 719,000 tons of primary aluminum. The door to even further expansion is left open as DPA has asked industry to consider further potential for new plant capacity.

The mobilization chief, who expects to leave government service Dec. 31, says he hopes that the successful candidate for President will choose his successor early enough to permit an easy transition of the leadership of the controls program come the first of the year.

AEC OK's Reactor Survey Offer

Pioneer Service & Engineering Co., Chicago, and Foster Wheeler Corp., New York, will study whether it's feasible for private industry to design, build and operate power-producing reactors. They plan to conduct the survey during the

next 12 months, following agreement negotiations with the Atomic Energy Commission.

The study will be similar to those conducted last year by Monsanto Chemical Co. and Union Electric Co. of Missouri, both of St. Louis; Detroit Edison Co. and Dow Chemical Co., Midland, Mich.; Commonwealth Edison Co. and the Public Service Co. of Northern Illinois, both of Chicago; and Pacific Gas & Electric Co. and Bechtel Corp., both of San Francisco.

DPA Gives Time-Limit Ruling

A rules interpretation governing beginning construction time limits for projects granted certificates of necessity for accelerated tax amortization is announced by DPA.

In cases not exceeding $1 million in the amount certified, the beginning of construction of one of several buildings for a firm will be considered to be the beginning of construction of all such buildings.

On projects of over $1 million, a time extension by DPA is required for any of the buildings not started within the six-month period specified in the certificate of necessity.

Where an ample time extension is requested, applicants should file their construction schedules, asking that extensions be granted in accordance with schedules.

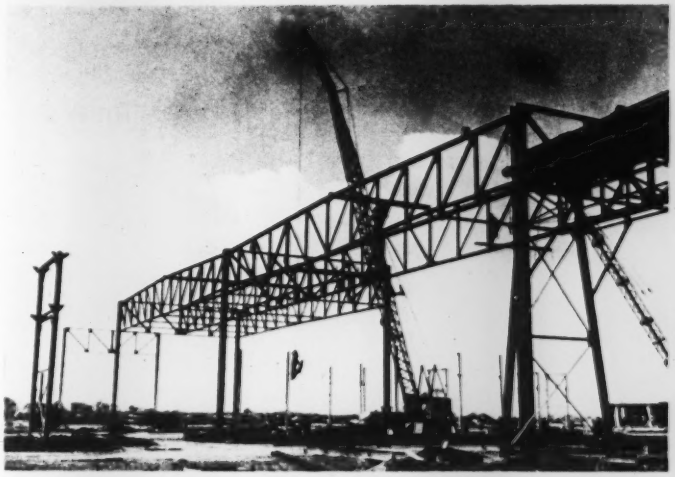
Loan Review Committee Set Up

A defense Loan Review Committee is established in the Office of Defense Mobilization and became effective Sept. 25.

The committee will handle applications for loans under section 302 of the Defense Production Act of 1950, as amended, which the RFC has denied or has notified its intention to deny to the certifying agency.

Loans must be certified as essential to the national defense by the secretary of agriculture, the defense production administrator or the defense materials procurement administrator.

The committee will review each loan application as described above and determine whether the interest of national defense requires that the loan be granted. It will report its recommendation to the director of defense mobilization.



THE SKELETON GOES UP AT G.E.'S APPLIANCE PARK IN LOUISVILLE
. . . all projects under way to get needed steel

Structural Steel: New Starts Limited for a While

ENOUGH STRUCTURAL steel to take care of all construction already started and for a limited number of new starts—that's the picture for the first quarter, 1953. The government's allotment policy was one of the main topics of discussion at the annual meeting last week of the American Institute of Steel Construction in Victoria, B.C.

A few projects in the first quarter will be getting more structural allocations. Atomic energy will get 87,629 tons, up 15,000 tons over fourth-quarter allotments. Defense Materials Procurement Agency will get almost twice its fourth-quarter bundle. But on paper almost all other programs have been hit hard for the time being, including even power expansion, petroleum, ships and transportation.

An Accounting—Actually, projects under way will get more steel than ever in many cases. DPA is holding most first-quarter allotments down to get even with its bookkeeping. The first-quarter estimated structural output is a substantial 1,415,000 tons. Uncashed fourth-quarter tickets may be used, and those plus the reduced quotas for the first period will enable many contractors to live higher structurally than they did before the strike.

But as DPA and the industry get even with themselves in the first quarter, the outlook is for a minimum of new job starts in that three months. One new construction job to start will be the Ohio Turnpike. Appeals are pending on other new projects; many may be approved if the situation improves more rapidly than expected. Once the books are balanced, the red ink should disappear from the structural steel ledger for the last nine months of 1953. The situation should not work undue hardship on contractors because January, February and March are normally their slack season anyhow.

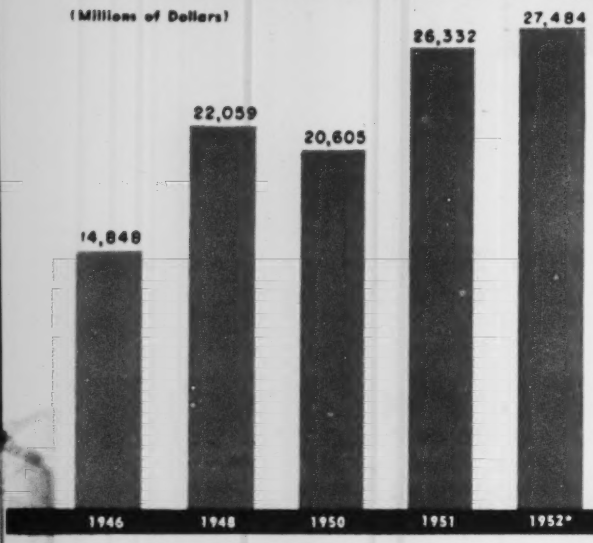
New Furnaces at Inland Steel

Inland Steel Co. will raise its productive potential by 750,000 tons a year with the addition of four new open hearth furnaces before the yearend. With the extra units, capacity will be 4.5 million tons annually.

One furnace is already operating at the Indiana Harbor, Ind. works. Another will follow next month and two more open hearths will be in operation by 1953.

Labor difficulties delayed this expansion, which had been planned for the first half of 1952. Officials say demand will surpass productive capacity well into 1953, despite additional output.

EXPENDITURES ON NEW PLANT AND EQUIPMENT BY U.S. BUSINESS[1]



1952 BY QUARTERS

	Jan.-Mar.	Apr.-June	July-Sept.[2]	Oct.-Dec.[2]
Durable goods mfg. industries	1,326	1,544	1,544	1,585
Primary iron and steel	356	468	429	465
Primary nonferrous metals	109	122	116	114
Fabricated metal products	87	89	96	88
Electrical machinery & equipment	80	96	108	123
Machinery except electrical	176	189	203	205
Motor vehicles & equipment	171	227	255	[n]
Transportation equipment excluding motor vehicles	65	62	58	44
Stone, clay, glass products	83	79	78	[n]
Other durable goods[3]	199	212	201	210
Nondurable goods mfg. industries	1,416	1,758	1,836	1,798
Food and kindred products	156	168	150	135
Beverages	67	88	81	88
Textile mill products	136	135	119	101
Paper & allied products	99	108	110	106
Chemicals & allied products	325	375	431	392
Petroleum & coal products	492	714	802	804
Rubber products	55	67	71	74
Other nondurable goods[4]	86	103	93	98
Mining	208	220	231	204
Railroad	362	281	331	372
Transportation, other than rail	361	378	373	366
Public utilities	847	957	1,104	1,160
Commercial and other[5]	1,708	1,713	1,726	1,696
TOTAL	6,228	6,951	7,325	7,180

[1] Data exclude expenditures of agricultural business and outlays charged to current account.
[2] Estimates for the third and fourth quarters are based on anticipated capital expenditures as reported by business in August 1952.
[3] Includes motor, products, furniture and fixtures, instruments, ordnance, and miscellaneous manufactures.
[4] Includes apparel and related products, tobacco, leather and leather products and printing and publishing.
[5] Includes trade, service, finance, communication and construction.
[n] Data not available separately but are included in totals.

Expansion: $20 Billion Yearly to 1960

Will total capital expenditures collapse now that the end of defense-inspired expansion is in sight? No, say businessmen who see high outlays for the rest of the decade

"THE AMERICAN businessman still wants to reinvest in his own country."

That's the consensus among metalworking executives interviewed by STEEL as the end of defense-inspired capital expansion comes in sight. A Chicago trade association executive predicts that capital outlays for the rest of this decade will hit a "norm" of $20 billion a year. They haven't fallen below that since 1947.

Up, Up, Up—Latest figures from the Office of Business Economics (in the chart above) show expenditures for new plant and equipment will continue to build up in the fourth quarter this year. Total will be nearly $28 billion for 1952. But, about 50 per cent of the $30 billion expansion directly attributable to the Korean war will be completed by yearend and the bulk will be finished by the end of 1953.

What will happen then? That depends first on the future course of the defense program. "A lot depends on how old Joe Stalin moves over there," says H. H. Watson, Pittsburgh Electromelt Furnace Corp., Pittsburgh.

Taxing Problem — It depends, too, on the outcome of the national elections. Crux of the matter is not which party gains control but the new government's taxation policies. Ralph S. Howe, director of the Metalworking Equipment Division of NPA, said in a talk before the American Machine Tool Distributors Association, ". . . if, through congressional action, the internal revenue tax law was rewritten to permit an optional rate of depreciation of capital investment of production equipment, there would be no need of any artificial support for the machine tool industry by the government." S. J. Swesson, secretary-treasurer of American Hot Galvanizers Association Inc., puts it in broader terms. "I think that every businessman is hurt by the high taxes. If we could go out and make a dollar and keep at least 10 cents of it, we would be a lot happier."

Some industries, like steel castings, are just catching their breath after being rushed into top production by the Korean emergency. They're only now taking time to modernize and incorporate technical advances into their equipment. Ralph West, president, West Steel Castings, Cleveland, doesn't look for a leveling off of expansions in that industry for two or three years.

To Be Heard From—Other industries are beginning to bulge their production facilities now that materials and equipment are becoming available. Private expansion plans are in the works for the chemical, electrical machinery, plastics, aircraft and automotive industries. There are indications that DPA still has expansion plans up its sleeve. The antifriction bearing expansion goal has recently been raised from $60 million to $77 million.

Over-expansion in metalworking

is generally regarded as a misnomer by businessmen who subscribe to the idea of an expanding economy. What's over-expansion today will be regarded as normal capacity five years hence. One of the factors most often cited is population growth. James Dawson, investment analyser for National City Bank, Cleveland, points to Bureau of Census medium estimates of 171.2 million people in the U. S. by 1960, an increase of 14.4 million over 1952. That's roughly equal to the population of New York state.

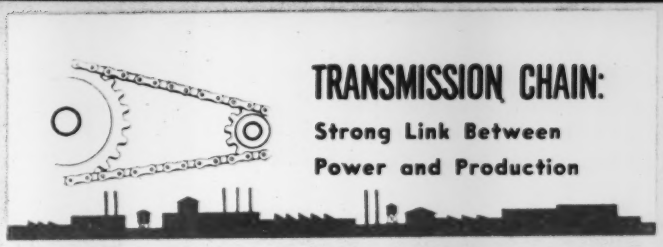
Besides, it's a fallacy to think of industry as operating continually at 100 per cent of capacity, says George Eaton, secretary of the National Tool & Die Manufacturers Association. Most companies want a little cushion of extra capacity, so they can take on the maximum expected load as it is occasionally required. It was normal before World War II to operate at about 75 per cent of that maximum potential. Since 1946 most of metalworking has operated close to 100 per cent; thus, still needed is a safety valve of some extra capacity.

General Controls Heads East

General Controls Co.'s new plant in Skokie, Ill., presents the spectacle of a West Coast firm expanding eastward, reversing the usual postwar Pacific Coast industrial trend.

The company, with home office in Glendale, Calif., aims at strengthening its Middle Western and Eastern market operations through the new plant. Built at a cost of about $600,000, the Skokie plant provides 60,000 square feet of floor space on a five-acre tract. Additional land is available for future expansion.

The plant now accommodates office and servicing facilities formerly located in the company's Chicago branch office, and also provides increased warehouse space for its automatic controls products. Within six months, assembly of these products will be undertaken and shortly thereafter complete facilities will be set up for manufacturing.



TRANSMISSION CHAIN:

Strong Link Between Power and Production

OVER THE LONG PULL transmission chain output has some weak and missing links, but it's stronger now than it was a year ago. Then backlogs were running three to eight months on many sizes. Today chain producers can offer many sizes from stock and others may be obtained in up to three or four months.

Keeping chain meshed with demand hasn't been easy. One of the toughest gaps to close was the shortage of nickel. In many installations the nickel-steel chain could not be replaced without endangering equipment or slowing production to lessen stresses. Careful analysis of individual job requirements and substitution of boron or straight-chromium steel where it was feasible helped lower backlogs for jobs where substitution was impossible. Some easing in the nickel situation has also played a part in delivery speed-ups.

Tight Chain — Right now the tightest pinch is in steel for larger pitch chains of the type used in steel mills, lumbering, mining, construction and chemical industries. Most chain makers believe the shortage was brought about by the steel strike and will be only temporary.

The steel strike also brought increased costs, but they're negligible when compared with wage increases granted the chain labor gang.

The inability to pass-through the wage hikes is making things as rough as a sprocket in the transmission chain industry which hasn't had a price increase since before the Korean War. That, say chain manufacturers, is their top problem right now.

Wheels Turn—But whether or not they make money, chain manufacturers are definitely making chain. Many are expanding capacity, but they're seeing their gains on backlogs wiped out by an added upturn in business since the end of the steel strike. As the flurry ends, supply - demand balance should be established without kinks, but right now backlog figures are climbing slowly.

Biggest customer is probably the construction industry with the conveyor makers and farm equipment not far behind. Direct defense orders are spotty. Morse Chain Co., Borg Warner Div., Detroit, reports that 19 per cent of its output is going into direct defense with tank sprockets a big item. Another strong field is aircraft control systems and some chain is used in ammunition hoists and gun breech blocks.

Most of the orders for chain today carry ratings, however, and a heavy volume is going into indirect defense and defense-support industries for the manufacture of defense end-products.

Sprocket Specialists—Recent expansions in the industry include outstanding extensions in sprocket production. Up to six-inch sprockets are made mostly of bar stock, over six-inch of plate steel with a welded hub and much larger sprockets are made of cast iron. There has been large concentrated growth in production of sprockets as many users formerly manufacturing their own requirements have discontinued and now buy from specialists in this field. They have found this to be considerably less costly.

Some of the gear manufacturers have entered the sprocket field, and the result of all the expansion is sprocket capacity beyond expectations.

But transmission chain people aren't worried about over-expansion. They know that as industry and defense grow ever more powerful, the link between power and output in many cases will be transmission chain.

OFFICERS OF ASSOCIATION OF IRON & STEEL ENGINEERS FOR 1953

PRESIDENT, JOHN L. YOUNG
. . . U. S. Steel Co.

FIRST V. P., E. L. ANDERSON
. . . Bethlehem Steel Co.

SECOND V. P., JOHN H. VOHR
. . . U. S. Steel, Gary Works

TREASURER, W. H. COLLISON
. . . Great Lakes Steel Corp.

Steel Men Assess Technological Growth

Exhibits at AISE show prove iron and steel expansion is matched with improved production techniques and better quality. Automation appears a strong trend

STEEL's rapid physical growth is being at least matched by its technological developments and improvements.

This was evident to the more than 10,000 iron and steel men attending the show and convention of the Association of Iron & Steel Engineers in Cleveland Sept. 30-Oct. 3.

While the industry's capacity is being expanded from slightly more than 90 million to 120 million tons in six years, its engineers are making an equally fabulous progress in insuring higher and more uniform quality of product, in getting more out of its raw materials, and in making the mills safer and better places to work.

Automaticity — Trend indicated in the more than 200 exhibits is toward more automatic controls toward more push-button operation.

One of the papers attracting wide attention was on "A Simplified Automatic Ingot Buggy," presented by I. N. Tull, retiring president of the AISE, in collaboration with Hugh S. Fegely of Westinghouse. The automatic conveyances are hailed as a forerunner of what some day may be automatic plants run by robot control.

Heavier Coils—Material handling exhibitors are taking cognizance of the trend toward heavier coils. Not many years ago, they were bragging about equipment that would handle 40,000 pound coils, then 60,000 pounds. Now the talk is of 100,000 pound coils and the materials handling people say they will be able to handle them.

Atomic Propulsion — Makers of industrial trucks are looking forward to the time when atomic energy can be applied to their product. B. I. Ulinski, Automatic Transportation Co., says that in the coming decade revolutionary developments in the conversion of nuclear fission products into tremendous amounts of electrical current can be expected.

Sales Reaction—Freyn Engineering Department of Koppers Co. reported the quickest sales reaction at the show. Atlas Steel of Canada visited the show early Monday, saw a model of a Rossi-Junghans continuous casting machine, made a quick trip to Allegheny Ludlum to verify a practical installation and promptly ordered a unit.

Writer—Kelly award for the best technical paper went to Louis Moses, mill engineer, Bethlehem Steel Corp., Bethlehem, Pa., for his "Report of Rolling Experiences," written while he was superintendent of Bethlehem's rail mill and roll department.

In addition to the officers listed above, the association secretary for 1953 is James D. O'Roark, Weirton Steel Co.

SELECTED DEFENSE CONTRACTS IN EXCESS OF $100,000

PRODUCT	CONTRACTOR
Shells, 175 mm	Lonsdowne Steel & Iron Co., Morton, Pa.
Hand Grenades	Fibre Forming Corp., Olean, N. Y.
Tube Forgings, Howitzer 155 mm	National Supply Co., Pittsburgh
Primers	Federal Cartridge Corp., Minneapolis
Motor Vehicle Parts	Reo Motors Inc., Lansing, Mich.
	General Motors Corp., Detroit
	Caterpillar Tractor Co., Peoria, Ill.
Small Arms Parts	Farm-Rite Implement Co., Chicago
Aircraft, XF-84H	Republic Aviation Corp., Farmingdale, L. I., N. Y.
Aircraft, B-36H	Consolidated Vultee Aircraft Corp., San Diego, Calif.
Aircraft Parts	Bendix Aviation Corp., N. Hollywood, Calif.
Rate-of-Climb Regulators	Ryan Industries Inc., Detroit
Exciter Regulators	Fletcher Aviation Corp., Pasadena, Calif.
Phase Inverters	Jack & Heintz Inc., Cleveland
Main Gear Pistons	Cleveland Pneumatic Tool Co., Cleveland
Aircraft Cameras	Bill Jack Scientific Instrument Co., Solana Beach, Calif.
Radar Sets	Raythson Mfg. Co., Waltham, Mass.
Receiver-Transmitters	Lewyt Corp., Brooklyn, N. Y.
Infra-Red Converter Tubes	Radio Corp. of America, New York
Computing Sight Equipment	Dictaphone Corp., New York

Electrical Future is Bright

Pointing towards a bright future for the electrical industry, General Electric Co. officials say the industry will produce as much electrical equipment in the next ten years as was manufactured in the past 74. They believe electrical manufacturing will expand nearly twice as fast as the rest of the economy.

CHECKLIST ON CONTROLS

Materials Orders

PRINTING PLATES—Revocation of NPA Order M-65 on Sept. 25, 1952, lifted the limitations on the length of time obsolete printing plates can be held by printing establishments.

OIL, GAS—Amendments of Sept. 30, 1952, of NPA Orders M-46 and M-46B ease materials controls for petroleum and gas industries in the United States and Canada. They expand the definition of "small construction operation" to include an operation where the total cost of controlled material is less than $5000 or which includes an enclosed structure with a total material cost up to $25,000. Other minor changes were included. Amendments were effective Sept. 30.

COPPER—Amendment of Direction 1 to NPA Order M-16, effective Oct. 1, 1952, permits brass and bronze founders, wire mills, brass mills and miscellaneous users to place advance orders for copper raw materials. The amendment permits companies who have received written authorization to accept delivery if the quantity is not in excess of 30 per cent of their allocations.

AIRCRAFT QUALITY STEEL—Revocation of Schedule 1 of Direction 1 to NPA Order M-6A, effective Oct. 1, 1952, lifts restrictions on purchases of aircraft quality steel amounting to more than 5000 pounds to a single customer.

Price Regulations

GARDEN TOOLS — Supplementary Regulation 34 of CPR 22, Supplementary Regulation 121 of General Ceiling Price Regulation and Supplementary Regulation 1 of CPR 161, all issued and effective Sept. 29, 1952, permit an 8 per cent increase in manufacturers' selling prices for agricultural and garden hand tools.

TRANSPORTATION COSTS—Supplementary Regulation 120 of General Ceiling Price Regulation provides wholesalers and retailers of a wide range of commodities with methods of adjusting their ceiling prices to reflect increased inbound transportation costs. This supplementary regulation extends to wholesalers and retailers who establish ceilings under GCPR substantially the same benefits set forth in CPR 7. It was issued Sept. 26, 1952, effective Oct. 1.

RECORD KEEPING—General Interpretation 8, issued Sept. 6, 1952, rules that any records which a seller of a commodity or service was required to have under the OPS regulation applicable to him when the material or service was decontrolled must continue to be preserved for the period of time specified in the applicable regulation.

COPPER—Amendment 2 of CPR 110, issued and effective Oct. 1, 1952, makes it clear that changes in the price of foreign copper do not affect ceiling prices established for rolling and drawing services.

CUSTOM-MADE MACHINERY—Supplementary Regulation 8 of CPR 30, effective Oct. 7, 1952, provides alternate methods for computing Capehart adjustments for such products as custom-made machinery.

Allis-Chalmers Scraper Prepared for Shipment

Towering above four workmen, this equipment marks the entrance of Allis-Chalmers Mfg. Co., Milwaukee, into the motor scraper field. At the firm's Cedar Rapids, Iowa, works the rubber-tired scraper is packed for shipment on a flatcar. Known as Model TS-300, it joins the A-C industrial line which includes diesel powered crawler tractors, motor graders, industrial wheel tractors and power units

Where Your Dollar Goes

President Truman plans to leave his successor a legacy of information on consumer dollars and where they go. He has assigned the job of making the study to the Federal Trade Commission, which over the years has made many important economic studies—some of which led to the enactment of legislation by Congress.

The information is needed to help in settling labor disputes; to help keep prices from rising; to provide industry and investors with cost comparison data; to provide congressional committees with essential information and to let the consumer know how much of his dollar goes to the retailer, the wholesaler, transportation, materials, labor and overhead. Mr. Truman also wants to know how much of the dollar the farmer gets as compared with manufacturers and distributors.

The commission is planning public hearings to determine the best approach. It will hear representatives of labor, farm and consumer groups to determine the nature of the data to be sought and the commodities to be studied. It has promised that it will not duplicate fact-finding facilities of other agencies and expects to ask the cooperation of the Commerce, Agriculture and Labor departments in obtaining the information it needs.

Members of the commission will apparently run the show rather than turn the hearings over to the economists for decision. An interim report is promised after the preliminary hearings and consultation with the other fact-gathering agencies. However, the commission has made it plain that the job will run for many months.

Writeoffs: $209 Million More

Defense Production Administration issued between Sept. 18 and 24 118 new certificates of necessity for new or expanded facilities amounting to $209 million.

Some 41 of the certificates issued cover projects involving $100,000 or less. Among the larger new authorizations are: R. C. Mahon Co., Macomb County, Mich., fabricator of structural steel weldments, $3,774,050; Briggs Mfg. Co., Detroit, aircraft assemblies, $1,911,000, and Capitol Foundry Co., Phoenix, Ariz., alloy steel castings, $1.9 million.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor*

Post Office inefficiency is proved again by comparison with Bell System, but with new significance: Pressure mounts to put red-ink federal departments in private hands

PROVING THE Post Office Department is inefficient is a little like kicking a dead horse but the dead horse is still delivering the mails.

That's why, in light of the present wave to get government-owned business into private hands which probably will be coming to a crest at the next session of Congress, a study by the Council of State Chambers of Commerce takes on added significance.

A Bell Ringer—Selecting the Bell Telephone System as a comparable example of private ownership, the council lines up the following facts in favor of private ownership: Gross receipts of the Post Office totalling $2,328,327,570 in fiscal 1951 included $551,044,570 received from the Treasury to make up a postal deficit. Bell System, from gross operating revenue of $3,639,462,365 in 1951, has a net operating income of $435,591,119 after paying out $629,559,000 in federal, state and local taxes. The Post Office Department does not pay any taxes.

In addition, the Bell System collected a total of $571,123,801 in excise taxes paid by telephone users and values its physical plant at $10,949,686,000. It is expanding aggressively and, by research, continually improving its services and lowering its over-all operating costs.

A Postal Leaner — Post Office morale is low and it often takes as much as two-and-a-half years to get action on employees' suggestions for improvements. And nobody in the Post Office Department has a remote idea of the value of the physical plant of the postal service.

Recommendations of the Hoover Commission pointed in the private-ownership direction. A bill (S. 3482) introduced by Senator Homer Ferguson, (Rep., Mich.), in the closing days of the 82nd Congress proposes a review of all federal business activities to determine whether they can't be carried on more efficiently under private-ownership. More should be heard on this subject when Congress reconvenes this fall.

Cherchez la Fonderie . . .

Pleased with the technical assistance given its foundry industry by a group of American foundrymen sent over last year, the French government recently asked the Mutual Security Agency to send over another team. It is to leave about Nov. 1 to spend a full year in France, with the French government and the French foundry industry paying salaries and expenses of the team members. Team leader is Charles E. Seman, formerly New York representative of the old National Founders Association. Other members: Victor A. Baldwin, International Heater Co., Utica, N. Y.; Earl J. Smith Jr., Ford Motor Co., Dearborn, Mich.; Harry B. Swan, Cadillac Motor Car Division, retired; Charles F. Walton, Case Institute of Technology, Cleveland; Ralph R. West, West Steel Casting Co., Cleveland; Ray L. Wormley, U. S. Radiator Corp., Detroit; Harry Oldham, Sutter Products Co., Dearborn, Mich.; James F. Gallagher, Ford Motor Co., Dearborn, Mich.; Jerry Mercer, Frank L. Crobaugh Co., Cleveland; J. H. Cannon, formerly of Ford Motor Co., Chicago.

Turkish industry is getting a lift from a two-man MSA team consisting of Max T. Ganzauge, foundry superintendent, General Railway Signal Co., Rochester, N. Y., and Ellis P. Mason, die design consultant, A. Finkl & Sons, Chicago. MSA is seeking a foundry sand control consultant to be third man in this group in Turkey.

More Beehives for Coke . . .

Oddly enough, the only coke oven expansion loan approved by General Services Administration for disbursement by the Reconstruction Finance Corp. was to finance construction of beehive ovens. The loan is to Lucerne Coke Co., an affiliate of Rochester & Pittsburgh Coal Co.

Reason for this loan, in view of the fact that "beehive ovens today are about as obsolete as the covered wagon," says Charles W. Connor, defense solid fuels administrator, is the limit in the number of slot-type ovens that can be built in a year. Hence, more beehive ovens were considered necessary to meet requirements of expanding consumer requirements.

Altogether, DSFA has approved rapid amortization of five beehive coke oven projects to cost around $2 million and provide additional productive capacity of 496,000 net tons annually.

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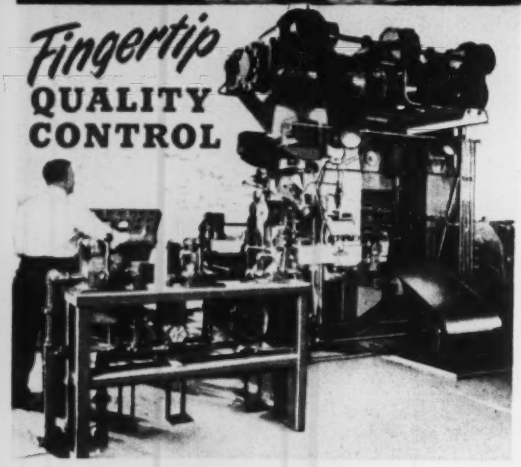

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Iron Fireman Co., Cleveland

Columbia Steel Co., Pittsburg, Calif.

Wrap Up Savings in Scientific Packaging

A revolution in packaging has been going on since World War II. Are you up-to-date? This story and the checklist on p. 59 can help you decide and guide you if you're not

By ART ZIMMERMAN
Assistant Editor

YOU CAN save 10 per cent of your packaging costs and improve your chances to make more sales in the bargain. That's a conservative outlook, say packaging engineers, if you haven't applied scientific techniques to packaging your product line.

International Harvester Co., Chicago, saves upwards of $50,000 a year from reduced cost of crating, increased efficiency of materials handling and greater use of storage space—simply through a change in the position of its product on the base of its shipping container. Philadelphia Electrical & Mfg. Co., Philadelphia, changed its type of container and the result was a saving of about $10,000 a year.

Here are some facts and figures which can start you in the direction of such savings. A complete recommendation giving all data for your particular case requires an on-the-spot study since it takes complete familiarity with your product and operation to come up with the right answers.

The Last Frontier

Merchandising, including packaging, has been variously described as the last frontier of cost savings and one of the quickest ways to more profits. Latest thinking tends to do away with the discrimination between industrial and consumer-type packaging. Instead of considering the shipping container as merely getting the product from the loading dock to the customer's receiving dock, it's now thought of as bridging the gap between the last machine in the producer's plant and the first machine in the user's plant. Consumer-packaging criteria of eye appeal, handling ease, and above all, utility, are being applied to industrial containers.

Heavy, odd-shaped pieces used to be thrown in a box car a piece at a time and unloaded the same way. Then came pallet loading. Ralph A. O'Reilly, packaging engineer for General Motors Corp., Detroit, says, "Expendable pallet loads of production material are perhaps the greatest single advance in recent General Motors packaging."

Experience has shown that pallet loads of odd-shaped pieces would shift in transit and loosen steel strapping. Current technique is to criss-cross such material wherever practicable. In the case of automobile balance arms, the operator at the last station in the supplier plant criss-crosses the U-shaped pieces on a pallet which is taken to the first station of assembly line.

With labor costs on the rise, that item is becoming equally important with packing materials and container costs. Mechanization and simplification techniques are used to hold packaging labor to a minimum. Often a change in container or inner pack is voted down because it would increase the manual labor

The relation between net weight, what your product weighs, and tare weight, the shipping weight including container, is coming into new importance. Often you pay shipping charges at your product rate for shipping the wood in your container. Research in paper and wood have enabled engineers to lighten the container without losing any protective qualities—with an eye to lessening transportation costs.

It all comes down to this—engineers are taking the packaging of industrial products out of the shipping room and onto the drawing board. They're building a container around the product instead of fitting the product to the container.

For example, Iron Fireman Mfg. Co., Cleveland, changed from use of wire bound crates to a corrugated carton with a single steel strap to package their M-2 oil burner furnaces. Cleveland Corrugated Box Co. and Hankin Con-

tainer Corp. jointly developed the design and production of the two-piece carton which gave the following cost comparison: Materials cost for wire bound crate—$6.55 each, labor and overhead—$2.10 each. Materials for corrugated carton now in use—$3.20 each, labor and overhead—$0.50 each. That's a difference of $4.95 per unit.

Maytag Co., Newton, Iowa, figures it can save about $34,000 a year through a reduction in size of the corrugated container for its automatic washer. Gaylor Container Corp., St. Louis, cites these two "extras" of the new container: One more tier of six washers can be loaded inside a railroad box car and there's display space for Maytag to invite all who see the carton to "See your local dealer for a demonstration."

But, it's not always a shift to corrugated cartons that effects savings. A maker of office machinery shifted from corrugated cartons to wire bound wood boxes with no addition in weight and a substantial reduction in "concealed" damages that is, damages to the product inside the container which cannot be discovered until the carton is removed.

A machine tool, formerly shipped in a single, cumbersome wire bound crate, is now shipped in two wire bound crates redesigned by American Box Co., Cleveland, one for the tool and the other for accessories. That way, the equipment can be dismantled enough to pressure-pack the components. Pressure packing consists of forming the inner pack to the outline of the product to hold the product rigid and to distribute the shocks in transit. The technique cut damage claims, reduced the cost of containers $2 per unit and reduced the total weight for shipping the implement by 21 pounds.

In line with the trend toward consumer thinking in industrial packaging, welding rods, formerly shipped in large lots, are shipped in smaller quantities so that the welder can take the shipping container on the job. No cost reduction, but certainly a boost for sales. Nails are now being shipped in fibre cartons like the USS Nail-Pak adopted by Columbia Steel Co., Pittsburg, Calif., which offers protection for the pack as long as there are any nails left. An industrial user commented to Columbia Steel, "We endorse this container 100 per cent for all our types of use, especially in our storeroom where space is so limited."

How Packaging Engineers Do It

First, packaging engineers get all the facts about the product, where it's going and how it's going and what will happen to it when it gets there. They work out comparative costs for different methods of packaging it. There's probably more than one general type of container which could conceivably fit.

They'll mock up samples of the container which seems to fit the needs and test it in the laboratory. They'll send out some test shipments and then go to the other end of the line and ask for reaction there. That's the way it's done at International Harvester Co., where the Manufacturing Research Department carries out packaging development. The new container is then either accepted or rejected. If accepted, a constant check is kept on reports from dealers who receive damaged merchandise. Every case is run down to find out what happened and why the container failed.

Is Your Packaging Satisfactory?

Without a packaging engineer in your plant, there's only one person who can decide whether your present containers are the most efficient and economical you could have, and that's you. Here are the considerations which should guide your decision. Call it your packaging quotient: $x/y = z$. Consideration "x" is the ease and speed, or lack of it, in your present method of packaging and your present percentage of damage in transit. If you have absolutely no damage in transit, you can be fairly sure you're over-packing. Factor "y" is all your costs. They include cost of materials, labor, storage and overhead. The result "z" is genuine customer acceptance of your product and container. If your costs are very high or your customer acceptance low, you can use the advice of a qualified packaging engineer.

Can You Afford an Engineer?

You can use this rule of thumb to decide if you can afford to hire a packaging engineer. These engineers say they can save you at least 10 per cent of your packaging bill if you haven't already instigated a co-ordinated program of packaging. Packaging engineers are available for salaries between $5200 and $9600 a year. Does 10 per cent of your packaging bill amount to more than you'd pay an engineer? Several smaller companies have hired an engineer to double in brass on other operations and only part of his salary is charged to the packaging account.

If You Don't Hire an Engineer

Most important, designate one man with the responsibility for packaging. Have him get in touch with your present container supplier. Most of them have testing laboratories and staffs of packaging engineers eager to work on your problem. Contact alternate suppliers, too. Competition will often bring you a much better package.

You can go to your shipper for advice. The Association of American Railroads, for instance, has had several committees active in improving and promoting good packaging and car loading techniques for over 30 years. Their Central Research Laboratory is on the campus of the Illinois Institute of Technology.

Don't forget to go to your customer for his reactions to your packaging. General Motors' Chevrolet Division requires incoming materials to be packed a certain way and sends specifications to its suppliers. Other companies may not be so thorough. They may just take their business elsewhere.

Your packaging man should preferably join an association, such as the Society of Industrial Packaging & Materials Handling Engineers, in Chicago, where he'll be able to exchange ideas with pack-

aging engineers from across the country. He'll be able to sit in on SIPMHE short courses, too. At least, have him subscribe to business magazines which carry articles on the subject. Other sources of information are packaging studies made by non-selling organizations like the American Management Association's Packaging Series.

Enroll your man in one of the college or university courses on packaging. Since the war several schools, like New York University, Wayne University, Purdue University, Cornell University, University of Florida and Clemson College, have been offering specialized courses. Wayne is offering ten courses this fall in what it calls materials management through co-operation with many industrial firms in the Detroit area. Next year, Wayne hopes to set up the first course leading to a bachelor's degree in materials handling and packing.

Or, you may wish to take your problem to an independent packaging engineer.

Don't Be Fooled

Don't let anyone tell you you've got the best and only container for your product without a complete investigation. Packaging is a rapidly growing field. Ideas are coming along regularly, like the Rite Size Box Machine, made by Colt Mfg. Co., Hartford, Conn., which will economically blank, score and slot small quantities of corrugated boxes in the size you want. Ternstedt Division of General Motors has come up with a flat pallet. The flat pallets have no "feet," the bottom of the pallet rests on the floor. Ternstedt reports a saving of 4 cubic feet per pallet. Scotch tape with continuous rayon filaments has been developed which has a tensile strength of 880 pounds per square inch. Crystal desiccants are being experimented with as corrosion preventatives for metal parts.

In each of the different forms of packaging there are changes and improvements being made. Certainly no one can be complacent if he has failed to re-evaluate his packaging since World War II.

HOW DOES YOUR PACKAGING STACK UP?

If you answer yes to at least seven questions, you are already aware of the advantages of scientific packaging. You're ahead of the game. But, improvements are appearing regularly in the field. Watch them. If you don't have the facts or answer yes to less than five questions, your packaging may or may not be the best vehicle for your product. There are many ways to make sure. The accompanying article can set you off in the right direction.

COST OF MATERIALS & LABOR

Is the weight of materials in my container in proper ratio to the weight of the product? Is it over packed? Yes ☐ No ☐

Do costs of comparative containers (paper vs wood vs metal) dictate my present form of container material? Yes ☐ No ☐

Are my sealing, anti-corrosion and inner-pack methods the most efficient type available? Yes ☐ No ☐

Would labor costs on a different type of container offset the increased cost of material? Yes ☐ No ☐

PACKAGING OPERATIONS

Is my packaging line partially or fully mechanized to gain full efficiency? Yes ☐ No ☐

Are my packaging operations designed to keep manual labor to a minimum? Yes ☐ No ☐

Are expediting techniques, such as criss-crossing and unit loading, used to a maximum? Yes ☐ No ☐

HANDLING & STORAGE

Is vertical space in my warehouse used to the maximum through racks and pallet loads? Yes ☐ No ☐

Are knocked down containers used where feasible? Yes ☐ No ☐

Do cost studies indicate my use of returnable or expendable containers? Yes ☐ No ☐

IN TRANSIT

Do my carriers assure me that my losses in transit are not above normal for my type of product? Yes ☐ No ☐

Is my loss well within my established percentage? Yes ☐ No ☐

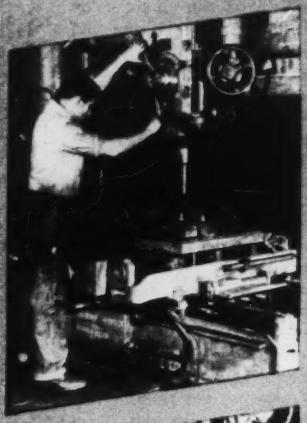
Are new containers pre-tested in a laboratory before being adopted? Yes ☐ No ☐

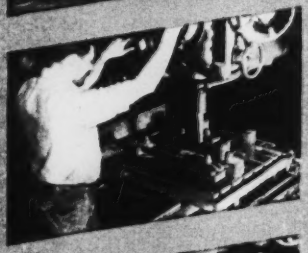
ADVERTISING & MERCHANDISING

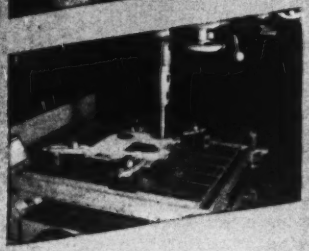
Can advertising be used on my containers to tie-in with the rest of my line? Yes ☐ No ☐

Are my distributors or customers happy with my present packaging? Yes ☐ No ☐

BULLARD SPACER







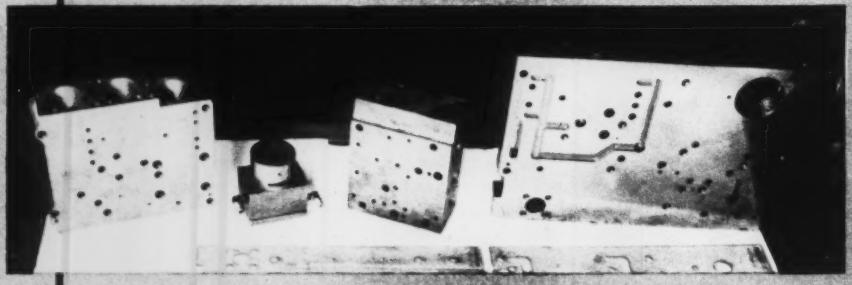
Norton Company, Grinding Machine Division

is obtaining important advantages from use of 4 BULLARD SPACERS on intricate drilling, reaming and tapping jobs.

Among the benefits received is a marked reduction in Operator fatigue. This is especially pronounced in overtime operation.

NORTON COMPANY has also found that with incentive time allowances, jig work Operators' efficiency is regularly held at 90% to 125%, while that of their Operators on BULLARD SPACERS runs 115% to 150%.

Ask for your copy of "The Norton Story"



THE BULLARD COMPANY

BRIDGEPORT 2, CONNECTICUT

By H. C. TUTTLE *Detroit Editor*

Mirrors of Motordom

Special-duty Jeep Rides on Road or Rail

Half jeep and half railroad car, this Hy-Rail car shown above is equally at home on highway or railway. Guide wheels for rail travel can be raised, placing stress on rubber tires, as is shown in the front of the vehicle. Guide wheels still grip the tracks at the back, supporting this Hy-Rail for rail travel. Some 35 similar cars manufactured by Willys-Overland Motors Inc., Toledo, O., serve American railroads in a variety of duties as replacements for conventional utility cars

Pooh-poohed only a short time ago, the use of plastics as a body material for autos is winning renewed interest. Plastics' first big test will be in sports cars

DETROIT

SEVEN MONTHS ago the auto industry for the most part poohpoohed the possibility of using plastic as a body material. But since that time practically every auto producer has begun experimenting with the nonmetallic laminates, either for complete bodies or for panels.

One highly-placed researcher into manufacturing processes calls utilization of reinforced plastics a "slowly-blossoming" field, but the near-frantic haste with which several members of the industry are working to find some practical method for medium volume and low cost production indicates that this characterization may be ultraconservative.

The Why of It—The fundamental reason for the abrupt turn-about on the part of many companies is probably the sudden awareness of the surprising strength of the sports car market. The plastic bodies which have been developed are for sports cars and the material itself has certain attributes particularly fitting it for this application—light weight and sleekness.

If the technique of making plastic sports car bodies can be developed to the point where the almighty dollar sign no longer favors steel then a true upheaval in a multitude of industries will take place. Most realists in the auto industry believe that this is a long way off, if ever. Before a year has gone, however, there probably will be several makes of all-plastic bodies in service and a much greater understanding of the limitations and potentials of the material.

Three Techniques—The material currently being used is built up from alternate layers of vibrin polyester resin and glass fiber. Three methods of forming this into the desired shapes are known to be under consideration: Wet "lay-up" in which the layers are molded, one at a time, over a form; forming the laminate by vacuum pressure into a female die; and molding it in match dies. The latter two require heat for the process; the first is a time-consuming procedure. In the first two processes surface finish on one side is imperfect; in the third process careful die finishing, more exacting, in fact, than that presently required for metal press work, is said to be demanded.

The relatively low investment required to become a small-scale plastic body builder has made it possible for several custom firms to enter the field, but the best known of the plastic body makers is Glasspar Co. in California. This company has been producing bodies commercially for several months, and it, and its materials supplier, Naugatuck Chemical Division of United States Rubber Co., have been contacted in recent months by several of the automakers.

K-F Takes the Plunge

One of these is Kaiser-Frazer, which is the first of the auto companies to say openly that it is going to make automobiles with a plastic body. President Edgar Kaiser dropped this bombshell on a group of newsmen at Willow Run recently. He announced that K-F will bring out a sports roadster seating three people. The unnamed car will be on the Henry J chassis and will be powered by the Henry J six-cylinder engine.

The plan is to produce 1000 of these cars. This is a far more ambitious market test than most other manufacturers are considering for their sports models. It will take about nine months, Mr. Kai-

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ser said, for this many to be built. The body producer has not yet been selected, and bids are currently being taken. The prototypes, however, have been built by Glasspar. Howard Darrin styled it.

Problem—K-F's venture is a true sports car. What some of its mechanical innovations may be has not been disclosed, and the foremost engineering problem, according to Mr. Kaiser, is to develop a means of eliminating the drive shaft tunnel. This puzzler has also stumped General Motors in its "Le Sabre" so if K-F can lick it they will gain many admirers. The car's 86-hp engine is not a producer of extremely high speeds. Mr. Kaiser says the top will probably be about 90 mph, but for road racing speed is secondary to performance in acceleration, and that is where the car ought to make its lightness felt.

Over-all weight of the car will be 2000 pounds. That's about 350 pounds lighter than the Henry J and is about 100 pounds lighter than if the roadster body had been designed in steel instead of plastic. It will have a cloth fold-down top.

Matter of Price—Past performance of Kaiser-Frazer (and other carmakers) indicates they may be over-optimistic when they predict price levels in which an unproduced car will fall. But Mr. Kaiser told their hopes by saying they were shooting for an f.o.b. price of $2000 and a delivered price of $2300-2400.

Appearancewise, the prototype car is unlike any now on the roads. It has none of the boxy appearance of the MG, but draws from the "envelope" styling school of flowing curves. A distinct dip in the door for elbow resting in the accepted sports car driver tradition follows the "gull wing" effect which Kaisers and Henry Js have. The doors, instead of being hinged, open by sliding into the fenders. The car has a trunk and a curved windshield. In place of a conventional grille—and marking the only place where bright work is used—a concave barred airscoop high on the nose is emplaced.

Test Case—Mr. Kaiser admits the company has no way of knowing what the future of the car is, and the reason for the 1000-unit test is to find out whether there is volume to be had in this kind of car. The company also intends to learn where plastics can fit in as an engineering material for more conventional type vehicles. It has done some researching into the laminated material for parts including panels and has encountered no difficulty from either heat or cold effects in these applications.

The nonmetallic materials are not the only ones intriguing K-F's engineers at the present time. Experiments with aluminum die cast doors have not been abandoned, and the company is "very actively" continuing its work on aluminum engines, Mr. Kaiser said. A new engine, maybe in 1954, is planned.

Better Entrenched—Kaiser-Frazer appears now to be entrenched more firmly in the automobile industry than it has been for a couple of years. The rumor that it is going to drop out has had a recent resurgence, possibly because of continuing merger discussions, but the best indications that the company may be over its hump come from two of Mr. Kaiser's remarks. First is that since July the auto portion of the company's business has been making money, that its breakeven point is less than the present 350-a-day schedule which is expected to continue through the end of the year. Second is that it has switched its emphasis to retail selling instead of wholesaling.

Cars will now be built to the dealer-order system, the method used by the rest of the industry whereby the dealers project their needs and schedule their orders with the factory accordingly. Up to now the company has produced cars with little regard to the dealers' size-up of the market and the result has been periodic inventory accumulations at the factory and in dealers' hands. From now on "if dealers want to make money they will have to pour the orders to us," says Mr. Kaiser. The auto market, to his mind, is back to normal, and the dealer hey-day is over. A crew of sales specialists has been working with dealers to show them how the basic fundamentals of selling can boost volume. Result of this "treated" dealer program, adds Mr. Kaiser, is that those which have been observed by the specialist for a five-day period increased their sales 21 per cent.

Little Change—Soon to be publicly introduced are the 1953 Kaisers and Henry Js which will require a close inspection to differentiate from this year's models. Horsepower will be moved up a small notch, the Henry J will have a new clutch, exterior trunk hinges will be removed, chrome will be used a bit more lavishly. Interior styling and interior safety features will undergo change.

Auto, Truck Output

U. S. and Canada

	1952	1951
January	409,406	645,688
February	467,691	658,918
March	517,207	792,550
April	576,505	680,281
May	546,673	695,898
June	560,947	653,682
July	246,461	522,858
August	293,722	571,442
September	590,000*	505,758
October		558,971
November		480,199
December		402,729
Total		7,179,161

Week Ended	1952	1951
Aug. 30	122,632	137,479
Sept. 6	111,095	103,224
Sept. 13	137,295	136,150
Sept. 20	147,748	135,015
Sept. 27	142,893	113,973
Oct. 4	146,000*	112,868

Sources: Automotive Manufacturers Association, Ward's Automotive Reports. *Preliminary.

Woolson Heads DeSoto

L. Irving Woolson, well known in automotive manufacturing circles and in the Society of Automotive Engineers, has been elected president of DeSoto Motor Corp., succeeding the late C. E. Bleicher. The new DeSoto head has been its vice president in charge of manufacturing since 1950, during which time he had been responsible for bringing into production DeSoto's first engine and body plants. His career in Chrysler began 24 years ago, as a draftsman. Working through Dodge Truck, Plymouth and DeSoto Divisions in various engineering capacities, he became DeSoto factory manager in 1943 and at the end of the war was put in charge of reconversion of DeSoto's facilities. In 1948 he was made operating manager of DeSoto. He was elected a DeSoto director when he became vice president.

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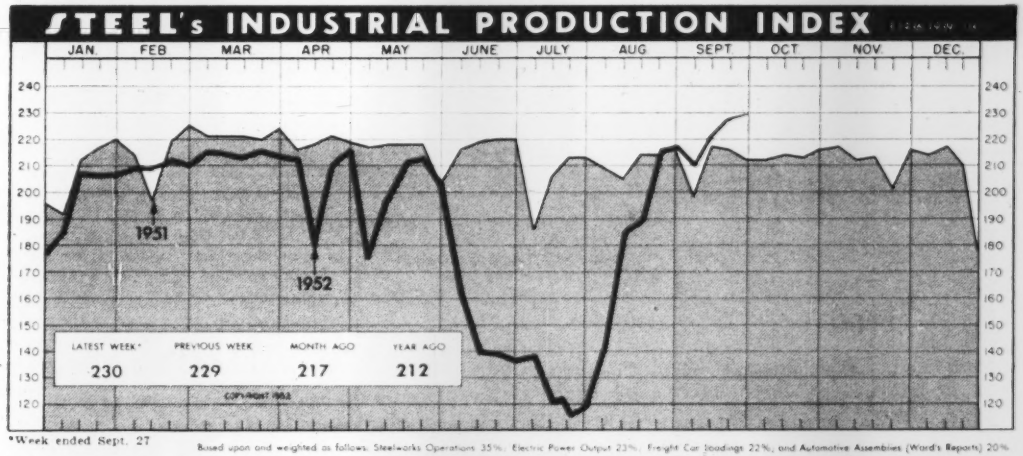
YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING


STEEL's INDUSTRIAL PRODUCTION INDEX
JAN. FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC.
240 230 220 210 200 190 180 170 160 150 140 130 120
1951
1952
LATEST WEEK* PREVIOUS WEEK MONTH AGO YEAR AGO
230 229 217 212
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*Week ended Sept. 27

Based upon and weighted as follows: Steelworks Operations 35%, Electric Power Output 23%, Freight Car Loadings 22%, and Automotive Assemblies (Ward's Reports) 20%

Many industries are boosting production to record levels. Industrial activity index loses upward velocity as change-overs cut passenger car output

BUSINESS ACTIVITY is soaring to record levels as our industrial velocity is stepped up by rising defense turnout, the drive to recover output lost by the steel strike and the seasonal upswing in consumer production.

The Federal Reserve Board reports that the nation's rate of industrial output in September climbed to 223 per cent of the 1935-39 average. That equals the previous post-war high set in April, last year.

Take a glance at some of the prime indicators of industrial momentum. They are pointing to high production by most metal-working companies.

Steel output rose to a new industry high within eight weeks after the strike's close. This record turnout may be surpassed in the next few weeks as steel companies place new facilities in operation.

Other Gains—Among other indicators of our high production levels are the bituminous coal output, electric power generation and freight car loadings. Soft coal production rose to a 1952 peak just before the strike deadline. Coal producers may maintain this level in the next few weeks, despite price hikes. Electric power production this year has remained about 7 per cent above the same weeks in 1951, but it is starting to show further gains. In the week ended Sept. 20, power generation was a good 10 per cent above the same week in 1951. Freight car loadings now have edged 1 per cent over the same week of last year. Loadings, however, may climb rapidly in the next few weeks, as both consumer and defense producers step up production schedules.

Index—Marking the high level of the nation's industrial output, STEEL's industrial activity index edged up 1 point to 130 per cent of the 1936-1939 average in the week ended Sept. 27. That's 18 points over the same week last year. Steel output, electric power generation and freight car loadings continued to climb, while auto-truck operations dipped in the week ended Sept. 27.

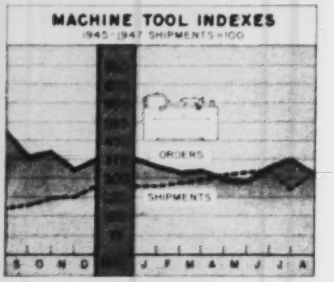
Steel Output Off Slightly . . .

Steel production dipped slightly last week, marking the first output decline since the end of the strike. U. S. plants turned out 2,153,000 net tons of ingots and steel for castings in the week ended Oct. 4, says the American Iron & Steel Institute. A week earlier, the industry produced a record 2,160,000 net tons of steel.

Auto Production Lags . . .

Most automakers are shoving their passenger car assemblies to new high-for-the-year levels, although the industry turnout is dipping under the record operations set three weeks ago. Reason for this decline is model change-overs by Chrysler Corp. The nation's car output in the week ended Sept. 27 totaled 104,899 units, or a 4287-unit slide from production in the previous week, says *Ward's Automotive Reports*. While this decline is temporary, Chrysler may not regain full operations until late this week.

Passenger car production in September jumped 77 per cent over August to 442,000 units, the best monthly total since June, 1951. Third-quarter assemblies, however, were trimmed by the steel strike to 839,000 passenger cars. That's the lowest tri-monthly volume since the first quarter of 1947. U. S. truck output reached 112,000 in September. This equals the April turnout, but the 29,194-unit turn-

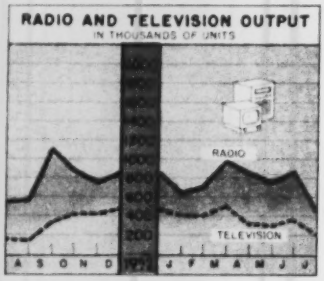


Machine Tool Indexes

1945-1947 Shipments = 100

	New Orders		Shipments	
	1952	1951	1952	1951
Jan.	347.8	475.4	266.6	114.3
Feb.	318.8	615.5	279.6	123.8
Mar.	324.3	590.3	299.5	158.9
Apr.	293.5	516.1	307.9	157.7
May	254.6	483.0	325.0	175.1
June	342.9	558.8	330.8	182.8
July	374.6	460.6	257.2	144.7
Aug.	311.7	488.9	316.0	178.9
Sept.		340.2		149.8
Oct.		403.9		221.3
Nov.		330.5		226.0
Dec.		376.5		264.7

National Machine Tool Builders' Assn.

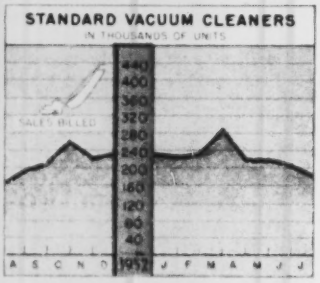


Radio and Television Output

Thousands of Units

	Radio		Television	
	1952	1951	1952	1951
Jan.	632	1,203	405	646
Feb.	770	1,313	409	679
Mar.	976	1,729	511	875
Apr.	848	1,337	323	469
May	748	1,373	309	339
June	874	1,083	361	327
July	441	548	199	152
Aug.		563		147
Sept.		1,100		337
Oct.		825		412
Nov.		748		415
Dec.		851		469
Total		12,714		5,267

Radio-Television Mfrs. Assn.

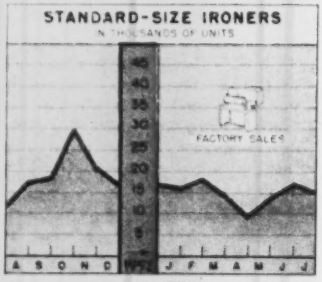


Standard Vacuum Cleaners

Sales Billed Units

	1952	1951	1950
Jan.	223,337	282,305	249,150
Feb.	230,226	261,572	263,315
Mar.	290,052	290,242	361,914
Apr.	217,169	227,216	292,664
May	216,969	201,953	215,845
June	206,939	194,548	250,190
July	188,713	181,002	219,967
Aug.	222,413	191,709	341,232
Sept.		210,406	327,524
Oct.		229,469	341,445
Nov.		219,919	265,319
Dec.		230,263	288,756
Total		2,729,104	3,529,414

Vacuum Cleaner Mfrs. Assn.



Standard-Size Ironers

Factory Sales Units

	1952	1951	1950
Jan.	15,636	24,600	20,300
Feb.	17,630	32,100	25,600
Mar.	13,913	34,700	37,500
Apr.	8,958	23,100	31,600
May	12,626	24,200	27,400
June	17,634	24,500	27,300
July	15,025	11,100	25,300
Aug.	16,477	17,200	42,200
Sept.		18,300	41,400
Oct.		29,800	47,500
Nov.		26,500	41,900
Dec.		16,900	38,800
Total		277,900	409,200

American Home Laundry Mfrs. Assn.

Charts Copyright 1952 STEEL

Basic Dates on other FACTS and FIGURES Published by STEEL

Construction	Sept. 15	Gear Sales	Sept. 15	Ranges, Gas	July 28
Durable Goods	Sept. 22	Gray Iron Castings	Sept. 22	Refrigerators	Sept. 29
Employ., Metalwkg.	Sept. 8	Indus. Production	Sept. 15	Steel Castings	Sept. 22
Employ., Steel	Apr. 28	Malleable Castings	Sept. 22	Steel Forgings	Sept. 15
Fab. Struc. Steel	Sept. 1	Pumps	Sept. 1	Steel Shipments	July 23
Foundry Equip.	Sept. 1	Prices, Consumer	Sept. 8	Wages, Metalwkg.	Sept. 8
Freight Cars	Sept. 29	Prices, Wholesale	Sept. 8	Washers	Aug. 18
Furnaces	Sept. 29	Ranges, Elec.	Sept. 29	Water Heaters	Aug. 18

out in the week ended Sept. 27 is the highest weekly volume since August, 1951.

U. S. and Canadian plants in the week ended Sept. 27 produced 142,893 passenger cars and trucks. This compares with 147,748 units a week earlier and 113,973 autos and trucks in the same week in 1951.

Orders for Structurals Up . . .

Bookings of fabricated structural steel hit a 15-month high of 257,773 net tons in August, reports the American Institute of Steel Construction. Shipments rose considerably over the previous month and were 4 per cent over the average 1952 month. On Sept. 1, the industry backlog of orders amounted to 2,363,487 net tons, of which 43 per cent was scheduled for fabrication in 1952.

Vacuum Sales Lift . . .

As demand increased for most household appliances, vacuum cleaner sales rose nearly 18 per cent in August. Factory sales of standard-size household vacuum cleaners totaled 222,413 units in August, reports the Vacuum Cleaner Manufacturers' Association. August sales rose 16 per cent over sales in the same month in 1951.

Sales of household washers jumped 22 per cent in August to 254,537 units, reports the American Home Laundry Manufacturers Association. The August total marks a 6 per cent gain over sales in August, 1951. Sales of automatic tumbler dryers in August aggregated 53,376 units, or 57 per cent over July and 32.8 per cent over sales in August of last year. Manufacturers of household ironers in August sold 16,477 units, up 9 per cent from July and down 4 per cent from sales in August, last year.

Retail Sales Unchanged . . .

While appliance sales moved upward, sales of all retail stores remained unchanged from the low volume in August, 1951. Prime reason for this is the low level to which the steel strike cut stocks of passenger autos. Sales of durable goods stores (on a seasonally adjusted basis) totaled $4240 million

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Output (per cent of capacity)[2]	102.5	102.0	101.5
Electric Power Distributed (million kwhr)	7,625	7,724	7,101
Bituminous Coal Output (daily av.—1000 tons)	1,921	1,971	1,832
Petroleum Production (daily av.—1000 bbl)	6,500[1]	6,514	6,298
Construction Volume (ENR—millions)	$317.1	$260.5	$335.1
Automobile, Truck Output (Ward's—units)	142,893	147,748	113,973
TRADE			
Freight Car Loadings (unit—1000 cars)	875[1]	874	803
Business Failures (Dun & Bradstreet, number)	156	145	154
Currency in Circulation (millions)[3]	$29,247	$29,292	$28,137
Dept. Store Sales (changes from year ago)[3]	+1%	0%	+3%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$18,558	$18,180	$17,125
Federal Gross Debt (billions)	$262.6	$263.0	$257.1
Bond Volume, NYSE (millions)	$15.7	$13.9	$13.2
Stocks Sales, NYSE (thousands of shares)	6,183	5,426	7,834
Loans and Investments (billions)[4]	$76.0	$75.3	$71.6
United States Gov't. Obligations Held (billions)[4]	$31.9	$31.8	$31.3
PRICES			
STEEL's Weighted Finished Steel Price Index[5]	181.40	181.40	171.92
STEEL's Nonferrous Metal Price Index[6]	221.0	223.2	224.6
All Commodities[7]	111.1	111.3	113.7
All Commodities Other Than Farm and Foods[7]	112.7	112.7	114.9

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1951, 1,999,035; 1952, 2,077,040. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

in August, compared with $4387 million in August, 1951. Nondurables stores sold $875 million in merchandise during August, about $22 million over sales in August, 1951. Sales rose considerably among food and apparel retailers.

Business Improves . . .

Business took a decided turn for the better during September, reports the National Association of Purchasing Agents. Buyers reported sharp increases in production, while increases in new orders exceeded declines. The steep inventory decline reported in the four previous months eased up a bit in September. While the inventory picture is still one of decline, more stockpiles are leveling off. Some members reported that they are now filling soft spots in their inventories.

Employment was again on the uptrend, as workers were recalled to make up lost production. Increased employment also resulted from the demand for holiday goods. Labor uneasiness in September increased as a result of the steel and coal settlements.

Prices in September continued to move upward, though at a creeping pace compared with August. Seasonal changes and OPS increases accounted for most of the slight rise. Most members maintained cautious buying policies, with forward commitments usually within a 90-day range. This short-term policy was caused by lack of confidence in prices, availability of most materials and the close range of production schedules.

Looking ahead, most of the buyers said they expected business to remain good through the middle of December. Beyond that date, there seems to be no definite pattern, says the association.

Business Failures Down . . .

Business failures are remaining at low levels, perhaps indicating a general bettering of conditions. Casualties totaled 594 in August, the lightest total for August in the last four years, says Dun & Bradstreet Inc. Liabilities that month totaled $16 million, the smallest amount in 18 months.

Trends Fore and Aft . . .

Industrial construction volume dropped 25 per cent under the average 1952 week in the week ended Sept. 25. . . Average hourly earnings of factory workers in August were 4 per cent over August, 1951. . . Consumer prices rose 3 per cent in the year ended Aug. 15, 1952.

REGULAR, CLOSE TOLERANCE AND INTERFERENCE FIT TYPES INSTALLED 5 TIMES AS FAST AS BOLTS

Save both weight and time in aircraft assembly by using Pheoll Hi Shear Rivets. These precision made fasteners are easy to install and provide maximum shear strength when critical parts are joined.

PHEOLL'S EXTENSIVE MANUFACTURING FACILITIES provide the aircraft industry with a constant source for alloy steel, stainless steel and 75ST Aluminum Alloy Hi-Shear Rivets in all types and sizes.

Partial List of Styles Available

NAS 177 100° Countersunk Head
NAS 178 Flat Binding Head
HS 2R7 Close Tolerance 100° Countersunk Head
NAA 2R6 Stud Rivets
HS 11 Brazier Head
HS 23 Close Tolerance 100° Countersunk Head—75ST Aluminum Alloy
HS 26 Flat Binding Head—75ST Aluminum Alloy
HS 27 Close Tolerance 100° Countersunk Head—Close Tolerance Shank
HS 28 Flat Binding Head—Close Tolerance Shank
HS 37 Close Tolerance 100° Countersunk Head—Close Tolerance Shank—Minimum Tensile Strength 160,000 p.s.i.
HS 38 Flat Binding Head—Close Tolerance Shank—Minimum Tensile Strength 160,000 p.s.i.
HS 47 Close Tolerance 100° Countersunk Head — Interference Fit — Minimum Tensile Strength 160,000 p.s.i.
HS 48 Flat Binding Head—Interference Fit —Minimum Tensile Strength 160,000 p.s.i.

NOTE: Other types made to customer's specifications. Ask about Hi-Shears for industrial use.

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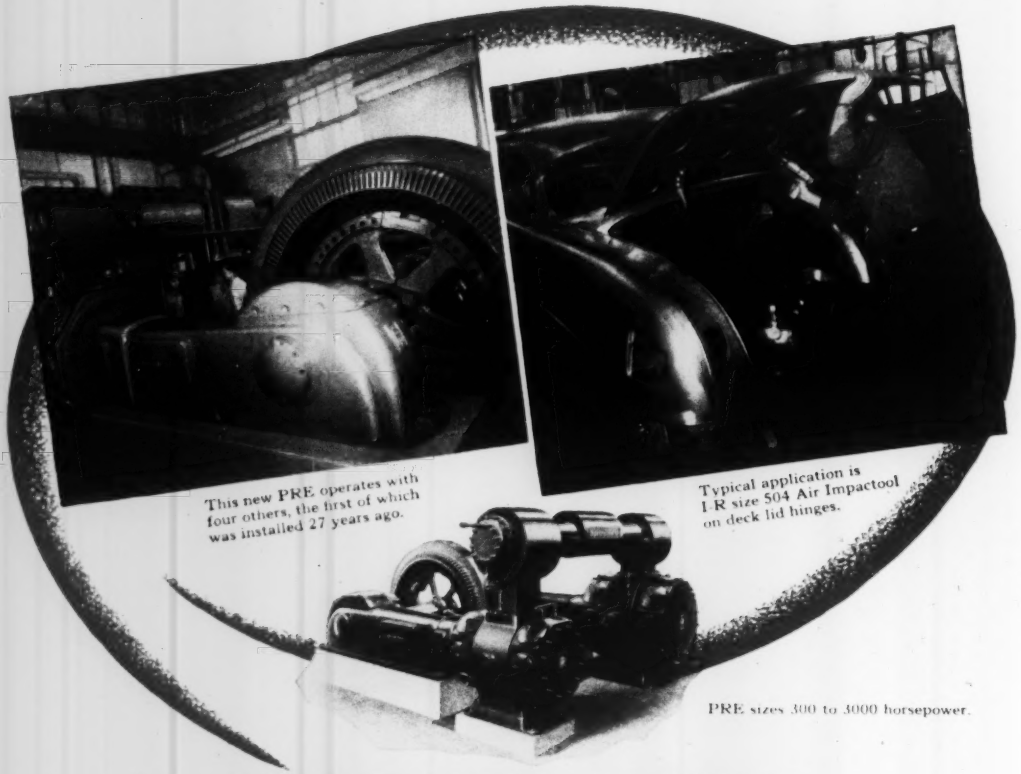
PHEOLL SCREWS BOLTS



This new PRE operates with four others, the first of which was installed 27 years ago.

Typical application is I-R size 504 Air Impactool on deck lid hinges.

PRE sizes 300 to 3000 horsepower.

HUDSON MOTOR COMPANY HAS SELECTED PRE COMPRESSORS SINCE 1925

Air Capacity of Gratiot Plant is now 13,200 cfm at 100 psi

When a fifth Ingersoll-Rand PRE Compressor went into operation recently, the Gratiot Plant of the Hudson Motor Company boosted its compressed air capacity from 10,000 cfm to 13,200 cfm. Thousands of air-operated tools, welders, paint sprayers and presses on the Hudson assembly lines set the pace which required this additional air capacity. The newest PRE operates along with four older PRE synchronous-motor-driven compressors. The first one was installed 27 years ago and is still going strong.

This is only one example of the dependability and reliability for which Ingersoll-Rand PRE Compressors are known. They are heavy-duty machines built for full-load service wherever large volumes of air or gas are to be handled. The two-cylinder design is standard on sizes up to 1000 horsepower. The 4-cylinder or so-called "4-corner" design is used on the larger sizes up to 3000 horsepower.

For the full story on the PRE, consult your nearest I-R representative.

Ingersoll-Rand

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COMPRESSORS • AIR TOOLS • ROCK DRILLS • TURBO BLOWERS • CONDENSERS • CENTRIFUGAL PUMPS • DIESEL AND GAS ENGINES

Men of Industry

C. B. FOSTER
. . . Cummins sales mgr.-engines

LELAND E. COULTER
. . . Allied Products appointment

IRVING R. TAYLOR
. . . Warren Machine & Die asst. mgr.

C. B. Foster was appointed to the newly created position of sales manager-engines for **Cummins Engine Co. Inc.**, Columbus, Ind. He continues in charge of all government contract work.

E. W. McCaul, secretary and general manager, Jervis B. Webb Co., has accepted the chairmanship for the remainder of 1952 of the 1953 exposition committee of the **Material Handling Institute Inc.,** Pittsburgh. He takes the place of **John C. Mevius,** former chairman, who has left the industry to enter business for himself. The next exposition will be held in Philadelphia May 18-22, 1953.

Frank A. Gorman was elected a vice president, **Eastern Stainless Steel Corp.,** Baltimore. He is vice president-general manager of Industrial Steels Inc., subsidiary.

Arthur Kelly was named vice president-manufacturing, **B. F. Goodrich Co.,** Akron, to succeed **T. G. Graham** when he retires Jan. 31.

P. F. Marsaw was named personnel manager, **Reed Rolled Thread Die Co.,** Worcester, Mass. He was previously assistant plant manager, Morgan Works, Wickwire-Spencer Steel Division, Colorado Fuel & Iron Corp.

In line with an expansion program at **Allied Products Corp.'s** precision parts plant in Hillsdale, Mich., the following changes have been made in the operating organization; **Leland E. Coulter** was named general manager of the R-B interchangeable punch and die activities, with **Peter C. Fortune** transferred from Chicago to Detroit as assistant to Mr. Coulter. **William Reece** was appointed to head sales in the Chicago territory and **Raymond E. Wilds** was named assistant sales manager of R-B products.

On Nov. 1 **Charles T. Zaoral** becomes vice president in charge of operations of **New York Air Brake Co.,** New York. **Lewis K. Sillcox,** formerly executive vice president, was elected vice chairman of the board. **Robert G. Hess,** formerly president of the company's subsidiary, Kinney Mfg. Co., was named manager of Air Brake's main division at Watertown, N. Y. He is succeeded at Kinney by **R. H. Mitchell,** formerly assistant to the executive vice president of Air Brake. **Frederic W. Hewes** was elected vice president in charge of finance.

Otto Janssen was made manager of spare parts sales, **AiResearch Mfg. Co.,** Los Angeles.

Irving R. Taylor was appointed assistant manager, **Warren Machine & Die Division,** American Welding & Mfg. Co., Warren, O. Mr. Taylor has been associated with another Warren concern, Taylor-Winfield Corp., for the last 19 years.

John Hellstrom, vice president, **American Air Filter Co.,** Louisville, was appointed director of sales of all AAF and Herman Nelson Division products. He returns from San Francisco, where he organized and managed the company's Pacific Division, and assumes his new duties Nov. 1.

Edgcomb Steel of New England Inc., Milford, Conn., appointed **Clifton P. Brown** assistant manager of its fastener division in Nashua, N. H.

R. H. Filsinger Jr. was appointed Pittsburgh district manager, **Vanadium Corp. of America,** to succeed **John B. Girdler,** recently appointed sales manager of the corporation. Mr. Filsinger was eastern district sales manager.

American Engineering Co., Philadelphia, appointed **H. Pagels** vice president in charge of manufacturing and **F. C. Messaros** vice president in charge of engineering. Mr.

Pagels has been works manager since 1945, and Mr. Messaros since 1946 has been chief engineer in charge of research and engineering.

Patrick A. Cavuto joined the sales and service department, electroplating division, **United Chromium Inc.**, New York. He formerly was in charge of the electroplating department of Muzak Corp.

Peter R. Prunkl was named plant manager, Tube Reducing Corp., Wallington, N. J.

Wayne H. Hunter was named assistant sales development manager of **Republic Rubber Division**, Lee Rubber & Tire Corp., Youngstown.

Promotions of engineers at **Worthington Corp.**, Harrison, N. J., include **John E. Lancaster** as assistant chief engineer, air conditioning and refrigeration engineering division; **William C. Osborne**, manager, research and development department; **Norman L. Meyerson**, assistant manager, research and development; **Frederick C. Gilman**, research engineer; and **T. A. Herman**, assistant chief engineer, reciprocating engineering division.

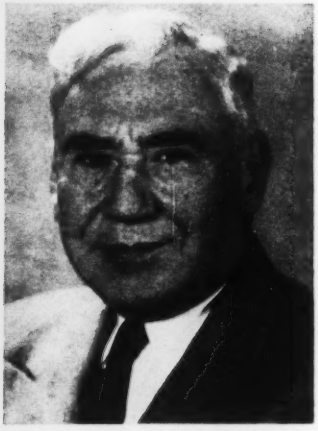
Ernest R. Johnson was appointed district manager of **Republic Steel Corp.'s** central alloy district in Massillon and Canton, O. He succeeds **George W. Putnam**, transferred to duties as a consultant for the entire Republic organization.

HOWARD T. BRINTON
. . . new president, Phelps Dodge Copper

Howard T. Brinton was elected president of **Phelps Dodge Copper Products Corp.**, New York, fabricating subsidiary of Phelps Dodge Corp. He succeeds the late **Whipple Jacobs**. **W. J. Palmer** was elected vice president in charge of manufacturing. **John J. Conlon** was named general superintendent of the Bayway Mills at Elizabeth, N. J. He is production manager of the two Elizabeth plants.

Sydney W. Taylor was appointed assistant general manager of **Kaiser-Frazer Corp.'s** aircraft division, Willow Run, Mich.

Dr. Samuel S. Kistler was appointed research associate, **Peninsular Grinding Wheel Co.**, Detroit. He recently resigned as director of research at Norton Co. to accept the deanship of the University of Utah college of engineering.



W. J. PALMER
. . . V. P.-mfg., Phelps Dodge Copper

J. T. Butler, previously with North American Aviation Inc. in charge of the hydraulic machine shop and hydraulic assembly plant, was named chief tool engineer at **Temco Aircraft Corp.**, Dallas.

W. G. Cole has been assigned to the Chicago office of **Bohn Aluminum & Brass Corp.**

Visi-Trol Engineering Co., Detroit, appointed **Sam R. Read** as staff engineer. Since 1936 he has managed several Detroit engineering companies having been an original partner in Pioneer Engineering Co. and owner of Standard Industrial Engineering Co.

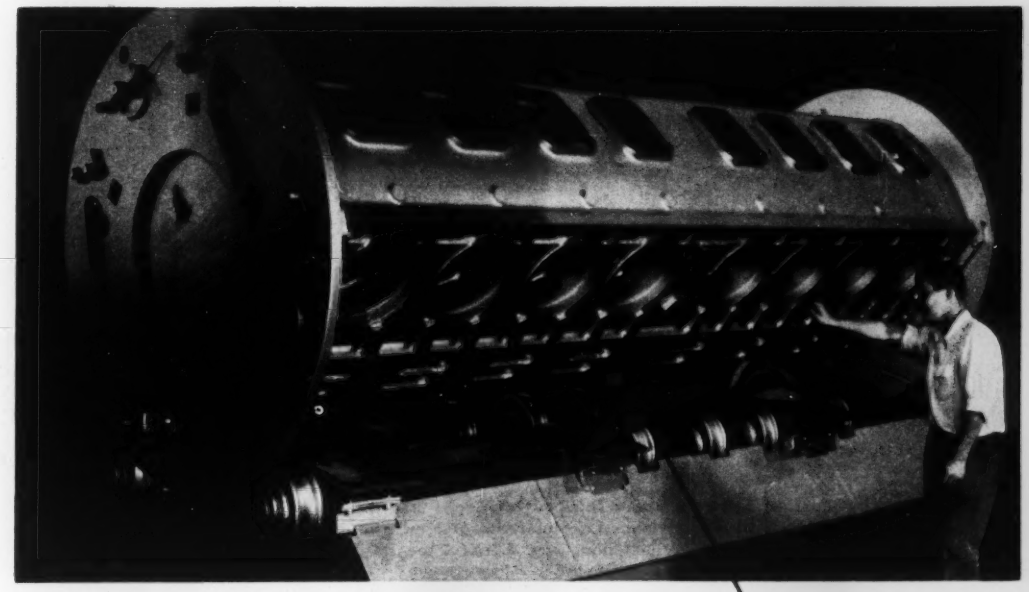
Raymond LeKashman was appointed manager, automotive division, **R. M. Hollingshead Corp.**, Camden, N. J. He succeeds **L. M. Olson**, resigned.

Kaiser Steel Corp., Fontana, Calif., appointed **J. P. Lencioni** superintendent, cold roll department and **W. J. Cox** assistant superintendent, conditioning yards and cranes. **P. E. Nelson** was named general foreman-cold rolling and annealing departments.

Luther R. Branting, works manager of **Alcoa Mining Co.'s** Bauxite, Ark., operations, retired after more than 32 years of service with the company. He is succeeded by **J.**

ERNEST R. JOHNSON
Republic's central alloy mgr.

GEORGE W. PUTNAM
. . . consultant for Republic Steel



could you clean this weldment IN 32 MINUTES?

WHEELABRATOR®
airless blast cleaning
CLEANS THIS 6 TON WELDMENT IN 32 MINUTES WITH 1 MAN

The speed and ease with which these huge railroad diesel engine weldments are cleaned is almost unbelievable. It takes only one man with a hoist to load a weldment on the work car of the Wheelabrator Room and the rest of the cleaning cycle is *entirely automatic.* In just 32 minutes the weldment emerges from the cabinet spotlessly clean both internally and externally. Thus one man handles the entire daily production — a job that formerly required 16 men operating two airblast rooms, in two plants of a prominent diesel engine producer, for a total of 128 manhours daily.

These weldments are about the most complicated welded job ever produced. They measure 44" x 53" through the cross section and vary in length from 55¾" to 146¾". Cleaning is required for removing welding flux, spatter, mill scale and a light heat treat scale.

There is no comparison between the thoroughly and uniformly cleaned surface now achieved in the Wheelabrator and the job formerly done by airblasting. Inspection has been simplified. Costly trucking and handling has been eliminated. More importantly, the overall cost saving is tremendous.

For your weldment cleaning problems investigate the Wheelabrator today. Write for bulletin No. 74-B.

WHEELABRATOR The perfected airless centrifugal blast unit pioneered by American slashes cost and cleaning time. Conserves power, labor, space. Cleaning perfection results in longer tool life, faster machining and grinding, easier inspection.

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WORLD'S LARGEST BUILDERS OF AIRLESS BLAST CLEANING EQUIPMENT

D. E. MOODY
. . . heads Canefco Ltd

EDGAR B. SPEER
. . . promoted at U. S. Steel's Gary Wks.

CHARLES E. MERTLER
. . . a V. P. of Stevens Mfg.

Thad Watters, who has been assistant works manager.

Electric Furnace Co., Salem, O., announces incorporation of a subsidiary company in Canada to be known as Canefco Ltd. with headquarters in Toronto. Officers of this new Canadian company are **D. E. Moody,** president; **K. U. Wirtz,** vice president; **H. E. Farintosh,** secretary - treasurer. Mr. Wirtz is also president of Electric Furnace Co.

John Longden was appointed district manager of the new district office opened by **National Electric Products Corp.** in Salt Lake City, Utah.

Dr. Leslie G. Jenness was elected vice president in charge of research of **Kennecott Copper Corp.,** New York.

Edgar B. Speer was appointed division superintendent of steel production at Gary Works, Gary, Ind., **U. S. Steel Co.** He succeeds **Oscar Pearson,** now assistant general superintendent at the Duquesne, Pa., Works.

Frank A. Whittall becomes president, **Continental Can Co. of Canada Ltd.,** Montreal, to succeed **Harry A. Rapelye,** retired.

Oliver Corp., Chicago, appointed **E. H. Fisher** director of marketing, **S. W. White Jr.** in charge of market research and **J. O. Cunningham** as advertising manager. Mr. Fisher, formerly general manager of the recently acquired A. B. Farquhar Division, York, Pa., is succeeded by **Frank J. Zielsdorf** who is replaced as manager of Oliver's Springfield, O., plant by **C. W. Thornell.**

Charles E. Mertler was appointed vice president in charge of engineering and development, **Stevens Mfg. Co. Inc.,** Mansfield, O. He has been chief engineer since March, 1950. For 21 years he was with Westinghouse Electric Corp., appliance division, where he last served as assistant manager of quality control.

Harry A. Torrence was appointed vice president for manufacturing and industrial relations at **Blackhawk Mfg. Co.,** Milwaukee.

Stronghold Screw Products Inc., Chicago, appointed **Charles Schwartz** assistant vice president in charge of manufacturing.

A. Dale Herman was appointed vice president and general manager, **Marman Products Co. Inc.,** Inglewood, Calif.

OBITUARIES . . .

Clarence E. Bleicher, 62, president and general manager, **DeSoto Division,** Chrysler Corp., Detroit, died Sept. 23 following a heart attack.

Thomas D. Potts, 56, vice president, **Adirondack Foundries & Steel Inc.,** Troy, N. Y., died Sept. 24 of a heart attack while vacationing in Hot Springs, Va.

W. C. Tregoning, 76, consulting engineer and inventor in the field of electrical equipment, died Sept. 28 in Cleveland. He had been associated with Cutler-Hammer Co., Clark Controller Co. and for the last several years with **Radiart Corp.**

D. F. Hahn, 52, vice president, production manager and a director of **General Box Co.,** Des Plaines, Ill., died Sept. 23.

Max F. Becker, 57, president, **M. F. Becker & Associates,** Chicago, manufacturers' representative for foundry equipment, died Aug. 28. Prior to establishing his own business in 1945 he was vice president, Whiting Corp., Harvey, Ill.

William J. Baxter, 73, head of fleet sales for **Fargo Motor Corp.,** truck sales division of Chrysler Corp., Detroit, died Sept. 22.

Harlan G. Newcomer, 77, former president, **Eureka Mower Co.,** Utica, N. Y., died Sept. 20. He retired in 1949.

Roland E. Govan, 42, sales promotion-advertising manager, **Falk Corp.,** Milwaukee, died Sept. 25.

OSBORN

Osborn has been cutting foundry molding costs for 43 years!

HERE'S HOW

- **DIRECT FACTORY SALES** through experienced foundry-trained Osborn molding field specialists who *spend all their time* on foundry applications.
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- **CONSTANT RESEARCH** that has pioneered the industry's major improvements in more efficient, lower cost molding and core blowing.

INVESTIGATE NOW. Have Osborn's representative check your requirements to see where production can be improved and costs cut. Call or write *The Osborn Manufacturing Company, Dept. 858, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

HERE'S PROOF. *Production increased* 75% at this foundry through Osborn's mechanical devices.

Serving the Foundry Industry for 43 Years

Osborn Molding Machines

MOLDING MACHINES . . . CORE BLOWERS . . . INDUSTRIAL BRUSHES

On assembly line operations...

ARE YOU PAYING FOR WASTE MOTIONS?

QUALITY, PRODUCTION-engineered EATON Springtites and Sems (bolts or thread-cutting screws with pre-assembled Reliance spring lock washers or multitooth washers) cut assembly motions for hundreds of users. In fact, in actual use, they cut these assembly motions from 8 to 3! Here's real economy on your assembly line operations. All the engineering data and samples you require for a trial test can be obtained by writing us today.

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Production AND Engineering NEWS AT A GLANCE

YOU MAKE THE ERRORS—If you're using photography in your scientific and industrial work, the latest German 35-mm reflex camera just made available in the U. S., is just about as foolproof as they come. Any errors made are entirely your own since it permits the user to preview the picture on ground glass through the same lens that is actually going to take the picture. The user has complete mastery over the picture-taking process with complete freedom from parallax. Photomicrographs, oscillographs, close-ups etc., in natural color or black and white, can be taken without requiring awkward apparatus or complicated procedures.

COATING METHOD SAVES MATERIALS—Critical materials such as copper and stainless steel are saved and higher electrical conductivity are provided by a new tube-coating method developed by the Naval Research Laboratories. The process permits control of deposit thickness, gives a transparent, nonmetallic film that may be cleaned and washed by regular means. Although colorless, the film appears colored due to light reflection—interference patterns, colors being determined by thicknesses of the film applied. To date, its most important use is in the production of halogen-quenched Geiger-Mueller counter tubes.

FAST TOOLING—By departing from the accepted pattern in designing and fabricating a complete set of tools to put aircraft components into production quickly, Jonco Aircraft Corp.[3] did the job in a record time of six weeks. Normally on a project of this type where tooling personnel are unfamiliar with parts and assemblies to be tooled, six weeks or more are required for preliminary planning alone. p. 80

WELDING MADE EASY—Here's an answer to somebody's dream—either a welder or a fabricator sweating out high labor costs. It's a new welding rod developed by Sightmaster Corp., New Rochelle, N. Y., that simplifies welding or soldering any grade of aluminum as well as any zinc-base metal such as pot or white metal. None of the usual preparatory precautions, flux, cleaning, etc., is needed in using it. You merely heat the metal beyond 800° F and rub it on. The metal from the rod flows through the aluminum skin and makes a weld stronger than the aluminum itself. Rod is produced by blending several metals and chemicals to yield a homogeneous, finely grained metal that melts and flows easily without spatter, and is free of lumps and irregularities.

"ICE-BOX" SLOWS HARDENING—To retain heat-treated alloys in a soft state between forming operations, Lockheed Aircraft Corp., Burbank, Calif., uses a 5000 cu ft refrigerator. The big "box", measuring 40 feet long, 12 feet wide and about 11 feet high, cools 25,000 pounds of aluminum from room temperature to minus 20° within 2 hours. It reduces the hardening period between heat treatment and final shaping to almost zero time. Its use speeds overall production and virtually eliminates breakage of parts in the forming operations that follow.

PROTECTIVE SKIN FOR LADLES—Aluminum foundry engineers have found a way to double the life of mild steel ladles. They are covering them with a high temperature ceramic coating developed by California Metal Enameling Co., Los Angeles. The coating—which withstands severe heat and thermal shock—protects the ladles against the molten metal to extend their life and reduce down time.

PAINT LOSS IS OUT—Paint loss, which runs up to as much as 85 per cent in many conventional spray methods for enamel finishes, is completely eliminated by conveyorized dipping process developed by Apex Stamping Co., Newark, N. J. The method, which the company describes as revolutionary, is controlled automatically in applying baked enamel and lacquer finishes to metal parts in quantity production.

TO HANDLE HOT CARGO—A barge designed to carry molten sulphur was launched recently at Bethlehem Steel's shipyard in Beaumont, Texas. Insulated with fiber glass, the 1000-ton barge will keep its cargo at a temperature near 300 F during its shipment from Texas Gulf Sulphur Co.'s mine near Liberty to the plant of Consolidated Chemical Industries in Houston. The sulphur is brought up from underground deposits in molten condition. By transporting it in the same condition rather than in dry form eleminates necessity of remelting when the product is used in making sulphuric acid.

METALWORKINGS—What happens when a big government research project is kicked off? At Bethlehem Steel (p. 76) it meant devising a method of handling a big forging job . . . . Tough to-remove crust on the outside of centrifugally cast jet engine rings (p. 78) presents several problems. Among the answers are a heavy duty machine tool plus stocky carbide tools . . . . New development in shell molding (p. 83) may spur on the use of the process. The new machine makes it automatic. A touch of a pushbutton turns out as many as 20 complete shells from a single set of dies . . . . A new unit for machining forged tees and ells is eliminating one operation at Special Screw Products (p. 86). By doing an old job by a new method the company is gaining about 20 per cent output . . . . Western need for draw capacity is filled by Sierra Drawn Steel's new 100,000-pound capacity machine. It's the first on the coast capable of pulling 4¼-inch rounds (p. 91) . . . . A new spectrochemical excitation unit (p. 92) seems to be one key to essential control in boron steels.

Metalworking Outlook—p. 39 *Market Outlook—p. 139*

One Way To Handle A Big Forging Job

Special handling in and outside the plant, and nonstandard forging practice were required to process giant disks from 92-inch ingots weighing 50 tons

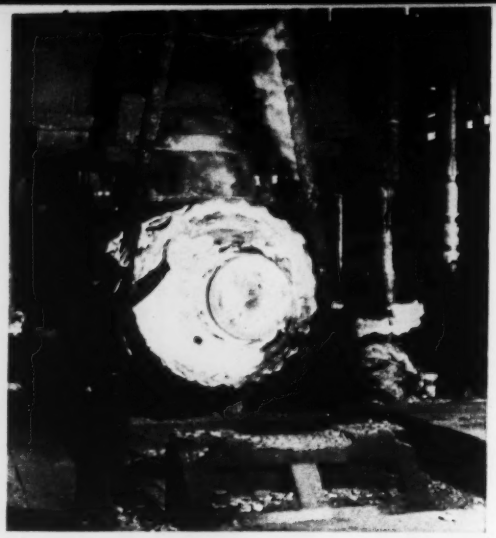
WHAT HAPPENS when a big government research project is kicked off—one like the new supersonic wind tunnel being built at NACA's Ames Aeronautical Laboratory, Moffet Field, Calif.?

At industry level it can mean resorting to nonstandard practice in forging, unsnarling unusual handling complications.

To Bethlehem Steel fell the lot of forging 11 giant rotor disks required for the larger of the two axial-flow compressors required by the tunnel.

Problems: In Big Doses—The company not only had to solve the problem of forging these disks from 92-inch ingots, but also figure out how to get the 18-foot diameter, 9-inch thick, 50-ton units to Newport News, Va., where they were installed in a compressor that looks like a giant tube 50-feet long and 24 feet in diameter.

The forging was done on a 7500-ton press. Due to the diameter of the work and the limited distance between press columns, position of the forging under the press necessitated partial forging two disks at once to avoid unequal loading of the press.

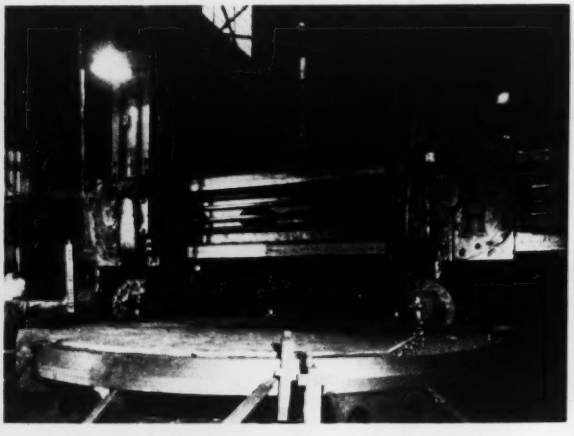


1 First operation—here a 92-inch ingot weighing about 50 tons, with ingot mold corrugations still visible, is being positioned in a 7500-ton forging press at Bethlehem Steel for its initial blows . . .

In-Plant by Rail—The disks were so large that they were moved about the plant in a specially-rigged railroad well car. From Bethlehem, Pa. to Virginia, they were mounted on a low-bed trailer truck and hauled under a special police guard since no rail route provided the necessary clearances.

Accompanying views show what happened at Bethlehem Steel, and how the disks were moved down South in heat treated and rough machined condition.

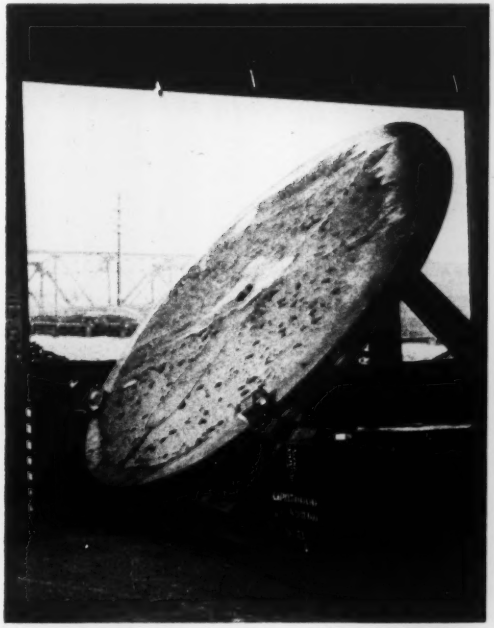
4 Last operation reduces lips. By widening the dies it wasn't necessary for wide section of forging to be under press. Finishing two forgings at once prevents overloading press . . .



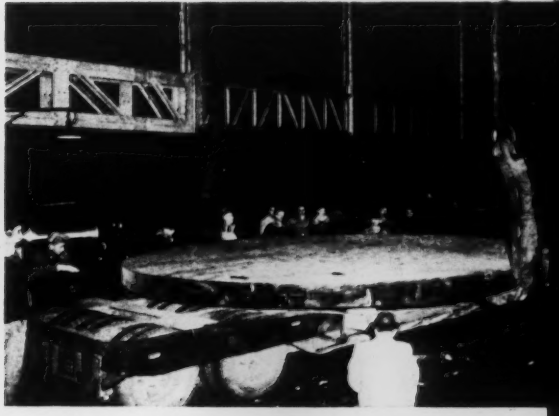
5 This huge vertical boring mill rough machines the giant disk after the 9-inch thick plate was annealed. Final machining was done at the customer's plant in Newport News . . .

2 Already cropped and upset at this point, the ingot is on its way to become an 18-foot disk. Diameter is being increased here and kneading action of the press refines the grain . . .

3 Greater part of the piece here is forged to the required thickness in a lengthwise path. Spread of press columns prevents forging to the necessary thickness leaving lips on each side . . .



6 View shows how in-plant materials handling problem was licked. A specially rigged railroad well car moves the rotor disk through the doorway while holding it at an angle . . .



7 Too large to ship by rail, the disks are loaded on a low bed trailer truck and driven 60 miles to a wharfside in Philadelphia for the final leg of their trip to Virginia by barge

Centrifugally Cast Jet Engine Rings:

HOW TO ROUGH MACHINE THEM

By FRANK MENINGER
Standards Supervisor
Stainless Engineering & Machine Works Div.
Cooper Alloy Foundry Co.
Hillside, N. J.

Tough-to-remove crust on the outside of centrifugally cast rings presents problems. Among the answers are a heavy-duty machine tool plus stocky carbide tools

ADVENT of jet planes and the increased demand for high temperature, corrosion resistant alloys is accompanied by attendant machining problems. One of the newest and toughest of these is tied up with recent developments in the art of casting stainless steel centrifugally in permanent metal molds.

Nature of the centrifugal casting process is such that impurities are forced to the outer surface. For this reason the rings are purposely cast heavy so when the scale is removed the resultant product will be free and clear of defects.

Tough Shell—Crusty scale, however, with its large amount of impurities is extremely difficult to remove. Machining problem is one of how fast this heavy crust can be removed economically.

Carbide tooling is an absolute necessity to machine the stainless alloys successfully at high speeds. Difficulty here is that the carbide industry seems to have gone beyond the machine tool industry. Many of the machines that have been in use for years and are still suitable for other materials, are inadequate for the demands created by high temperature resistant alloys. To use carbide tooling properly, there is a general need for faster and heavier machines.

Three Kinds—Most common jet ring alloys cast at Cooper Alloy Foundry Co., are of three types: Straight chromium, chromium-nickel-molybdenum 18-8 and the special chromium-nickel-molybenum-tungsten alloy.

Straight chromium material as cast is martensitic in structure with a hardness of about 400 Brinell. It is tempered at 1400 F and air cooled to produce a structure of tempered martensite with a hardness of about 200 Brinell.

Structure—Tungsten bearing alloy as cast consists of carbides dispersed in austenite. It is heat treated at 1950 F and air cooled to homogenize with the structure and dissolve the carbides which precipitate in finer particles on cooling. Hardness remains about 200 Brinell.

The 18-8 molybdenum bearing alloy is similar to the tungsten bearing material except that it contains some ferrite.

Machine Muscle—First consideration in the machining of any of these alloys is machine size. Since these rings are cast with outside diameters ranging to 40 inches it is necessary to use a vertical turret lathe with a minimum table size of 48 inches.

Tremendous torque created by the cutting action of these materials makes it necessary for the machine to overpower the job. We have found a successful machine for the job to be Webster Bennett vertical turret lathe, a British built, heavy duty machine.

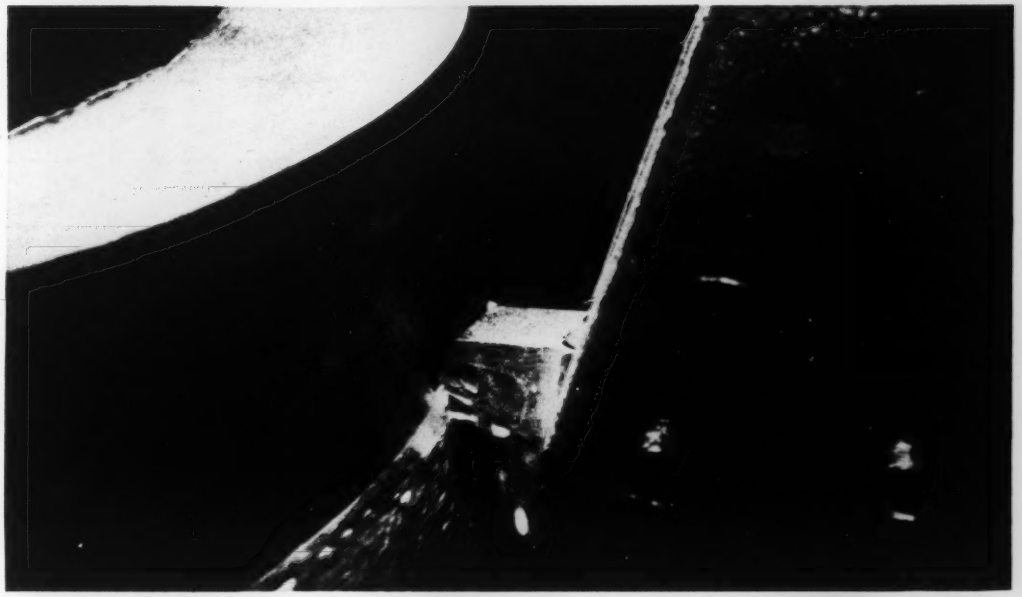
Tips on Tools—Next item of importance is the tool. The most practical size is one with a 1-inch shank. This proves to be strong enough to absorb punishment and yet not too awkward for basic operator grinding. We use Carboloy grade 78B for best shock and wear resistance on all analyses. This grade can be purchased to approximate shape and size requirements.

Holding device is also of extreme importance. Since most vertical turret lathes or boring mills have hand-tightening jaws, it is best to use the independent three or four jaw chuck. When using the universal type slippage occurs due to the cutting action torque. When reversing the piece and holding by the finished surface, it is recommended that heavy brass shims be applied to prevent jaw penetration.

A further factor of importance is the boring bar. To reduce vibration when boring, the bar should not be smaller than 5 inches OD. Smaller bars will cause excessive vibration, ruin the tool and make it impossible to hold dimensions.

Surface feed of up to 0.010-inch per revolution for scale cut is obtained without the use of any coolant. However, when taking the scale cuts at the recommended surface feet, it proves beneficial to apply a black sulphur base oil to the scale.

This lubricates the surface sufficiently to permit freer cutting. Lubrication helps most where the cut does not get under scale completely.



Closeup of the tool area showing the rough-cutting of the scale from cast jet rings. Speed is as high as 350 sfm with a 0.010-inch feed per revolution. Depth of cut here is about ¼-inch. This is done without coolant

Comparison between centrifugal cast ring and the same type ring after rough machining cuts are completed

CAST ALLOYS

Type	12 Cr. (LC)	23-12W	18-8-SMO
AISI Designation	410		316
ACI Designation	CA-15		CF-8M
SAE Designation	60410		60316
Carbon	.15 max.	.15-.30	.15-.25
Chromium	11.5-13.5	22-25	17-20
Nickel	.5 max.	11-14	12-15
Silicon	1.0 max.	.75-2.0	1.0 max.
Manganese	1.0 max.	1.0 max.	2.0 max.
Molybdenum	.5 max.		1.75-2.50
Tungsten		2.5-3.5	

TOOL GRIND DATA

Mat'l	Lead Angle	Rake Angle	Tip Radius	Side Clearance
12 Cr (LC)	15°	*Pos. 3°-5°	1/16"	6°-7°
18-8-SMO	30°	Neg. 3°-5°	1/8"	5°-6°
23-12W	45°	Neg. 5°-7°	1/8"-3/16"	4°-5°

* Actually a ground-in groove type chip curler

OPERATING DATA

Mat'l	Scale Cut SFM (Max)	Scale Cut Feed/Rev.	Normal Cut SFM (Max)*	Normal Cut Feed/Rev.	Depth of Cut
12 Cr. (LC)	150	.010"	300-350	.020"	.250"
18-8-SMO	75	.010"	150	.020"	.200"
23-12W	50	.008"	100	.016"	.150"

* SFM above these will burn tool without a coolant.

Mounting part locating devices on tool surfaces of the flap rivet fixture. Crew of 35 jig builders completed 18 similar fixtures in 25 working days

Big Tooling Job Completed

Departure from accepted pattern for designing and fabricating a complete set of tools was necessary to put aircraft components into production in six weeks

By DON K. ANDREWS
Industrial Engineer
Norris Engineering Co.
Dallas

COMPLETION of a set of tooling for any product is always welcome news to those concerned. However, a tooling project recently completed by Jonco Aircraft Corp. at Shawnee, Okla., for Servel Inc. may be of interest to anyone concerned with airframe (or related type) production because of the speed and the manner in which the job was done.

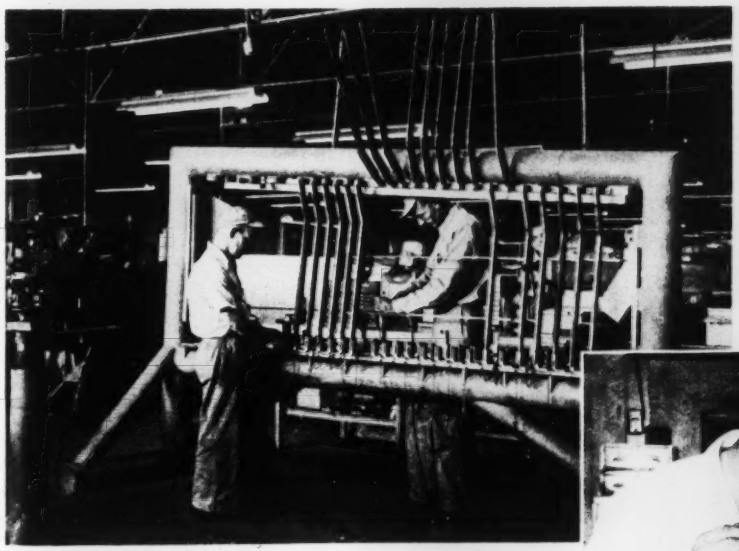
The Problem—Project consisted of designing and fabricating a complete set of tools, from blank templates for detail parts through final assembly fixtures (including inspection and balancing fixtures), to be used for producing the flap assembly and the aileron assembly for a new model of a jet fighter airplane. In addition, all of the existing planning as to sequence of assembly, method of assembly, and method of parts fabrication was to be reviewed and revised as considered necessary. Too, since fabrication of duplicate tooling was considered likely at a later date, a complete set of tool drawings was specified.

Servel's production commitments were such that it was essential that they be able to commence fabrication of flap and aileron assemblies within six weeks.

Normally, on a project of this type, where none of the tooling personnel are familiar with the parts and assemblies to be tooled, six weeks or more would be required for preliminary planning and for study of engineering design drawings, engineering standards, tool standards, tool and production shop capacity, etc. Certainly, when time permits, this planning and study is desirable.

Numerous Ways — Decisions based upon this type of planning and study must, of course, always be made. There may be wide variations in the how and when (and success) of making these decisions. For example, in the course of tooling for the production of any product, the question may arise as to whether or not some jig, die or fixture should be formally designed. Every tool made anywhere has some type of design although that design may exist only in the mind of the tool maker, may be completed only after the tool is completed and in use in production and may never be recorded on paper.

For this project, Jonco's management decided upon a course of calculated risk designed to produce



Jonco inspector Bob Banks checks a mill fixture used for one of the machining operations on the aileron counterbalance support

Jig builders putting finishing touches on assembly and drill fixture for left hand flap assembly. Hinged vertical bars are used to position ribs of the flap frame

in Record Time

a usable, improvable and recorded set of tooling in the shortest possible time. The manner in which the first piece of tooling was fabricated illustrates the pace at which the whole project moved.

No Lost Motion—On the first afternoon in Jonco's shop offices, Servel's representative, Ed Werner, began outlining their general requirements. As he talked and sketched, one of Jonco's shop foremen, John Reed, observed.

A few hours later Reed returned from the shop and asked the Servel representative to step outside a moment. On the shop floor sat a complete picture frame type rough structure for the aileron assembly and drill fixture. An isometric sketch of this rough structure was prepared, and the pertinent dimensions tabulated. Due to the similarity of shape and size of the aileron and flap, this one sketch served for the immediate fabrication of 12 rough structures—six each for flap and aileron assemblies as follows: One left hand and one right hand assembly and drill fixture, one left hand and one right hand rivet fixture and one left hand and one right hand check or inspection fixture.

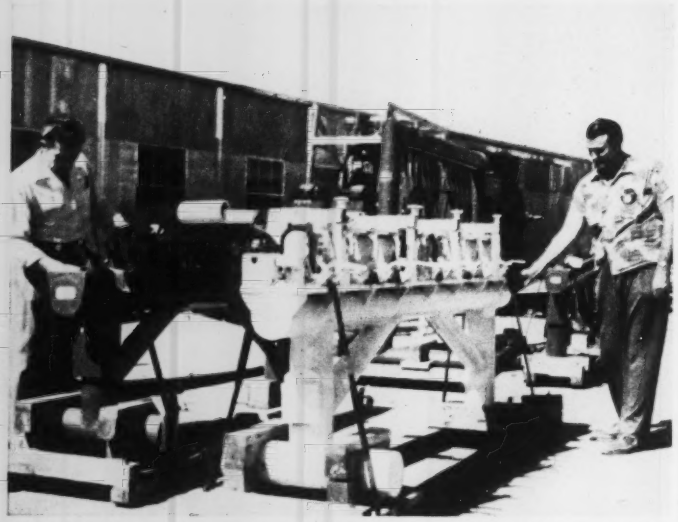
Underway—Using the preliminary planning sheets as a guide, a preliminary list of all tools required (about 400 initially) was prepared, work order numbers assigned and tool make orders typed. It was realized that many of these orders would be cancelled and new ones added as the program progressed, but it was believed that the time saved by having the usable ones ready and waiting would more than compensate. In practice this proved true.

These tool make orders were then held in the tool control station until a print of the tool drawing was provided.

Twelve experienced tool designers were assigned to the project. These were loosely organized into two groups—one for aileron tooling, the other for flap tooling. As rapidly as planning for detail parts could be jelled—which parts drilled and which left blank, etc.—preliminary layouts and free hand sketches on vellum were prepared.

Red Tape Cut—Drafting standards were abandoned at this stage, and concentration given to deciding what was required for each operation and putting this information into the hands of the tool makers in the shortest possible time. Each designer checked his own work, obtained one print which was delivered to the tool control station, and retained the vellum original at his desk.

In many cases, as soon as sufficient design information was on paper to enable cutting of material, ordering special items, and



Supervisors check shipping skids and hold-down straps on completed assembly and the drill fixture for the flap leading edge and aileron leading edge

preparation of tooling aids, the first preliminary print was made and sent to the shop. As more information was added by the designer, a "change B" copy was released and the first print destroyed. With only one tool print in existence at any time, changes and corrections were readily made without duplication.

No Extra Copies—Another deviation from usual airframe tooling practice was the use of a single set of operations sheets. The purpose of this was to provide one master source of planning data for all concerned with the project. In airframe production, each part of an airframe assembly requires an operation sequence or planning sheet. These sheets outline complete manufacturing instructions including the sequence in which the various operations are performed, on what machine tool, and what special tool, if any, is to be used for each operation. Operation sheets also specify: Which rivets and bolt holes are to be drilled in the parts before assembly, whether holes are to be full size or under size to permit reaming or match drilling at assembly and the assembly sequence of parts making up subassemblies and assemblies.

Importance of drilling and assembly sequence is readily apparent when the complexity of the usual airframe component is considered. In this case, the flap assembly (smaller and less complex than the aileron assembly) consisted of more than 75 different parts, each attaching to two or more other parts with two or more rivets or bolts.

Normal Procedure—Usually operations sheets are prepared well in advance of the tool design and tool fabrication function and are printed and widely distributed. Changes and additions are effected by issuing revised copies to those on the distribution list.

A preliminary set of operations sheets was prepared subject to review and revision as considered necessary. Only one of the sets furnished by Servel was released for use in the Jonco organization. All planning changes were made directly on this one master set, and all entries made by one man assigned to that function. It was his responsibility to see that any change made which might affect a tool in work was brought to the attention of those concerned.

Purpose of this procedure was to eliminate the number of planning changes in the mill of paper work and to insure that all concerned would have immediate access to all planning changes.

Central Storage—Master set of operations sheets were retained in a small room adjacent to both the shop and design areas. On the walls of the room were taped the key engineering drawings for convenient reference, and this space served as the project library.

Each toolmaker was responsible for the tool prints which accompanied the tool orders assigned to him, and was responsible for delivery of both print and tool to inspection. Those prints requiring cutting into separate sections, so that two or more toolmakers or machinists could work on different tool parts simultaneously, were reassembled and taped together before the completed tool was delivered to inspection.

Changes and additions made by the toolmaker and dimensions required for duplication of the tool were marked on the print. The inspector checked the tool to the print and the print to the tool. Both the tool and the tool print were checked to the engineering drawings, operations sheets, master tools, loft lines and engineering and tool standards. Master tools which established the critical points (hinge lines, etc.) on the flap and aileron to insure interchangeability were provided by Servel, along with the engineering drawings, engineering standards sheets, and the sheet metal loft lines reproductions which are the conventional sources for dimensional control in airframe tooling fabrication.

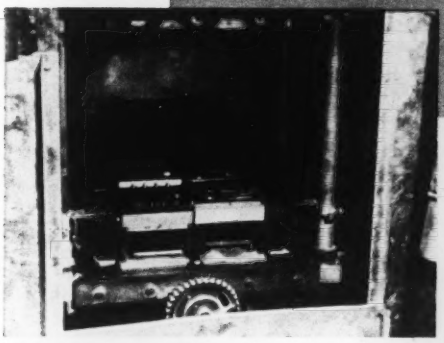
Following inspection approval of the tool, the inspector signed the marked tool print which was returned to the tool designer. When time became available, designer then prepared a standard tool drawing incorporating information furnished by shop marked print.

Scheduled Delivery—After each tool was approved by a Servel representative at the Jonco plant, the tool was crated to prevent damage in shipment, and shipped immediately to the Servel plant at Evansville, Ind. And, most important, all were shipped on time.

It should be noted, too, that this entire project was carried out as a part of the regular work load in Jonco's tool shop with other deliveries on schedule.

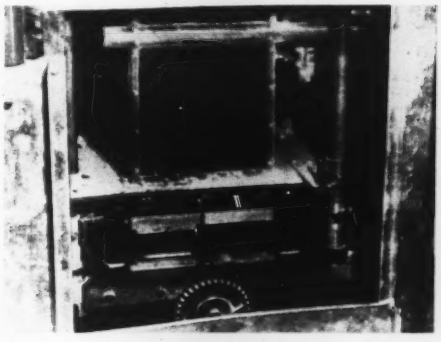
Shell Molding:

NEW MACHINE MAKES IT AUTOMATIC

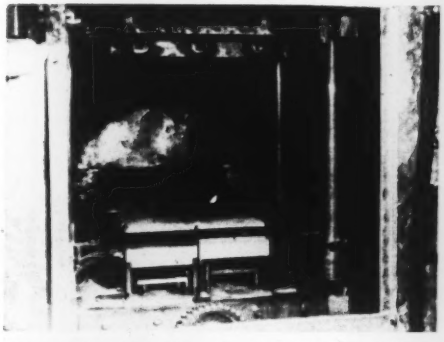


Shell molding dies, shown on machine's table, are heated by electrical heating elements in die shoes

New development to spur on use of process. The pushbutton setup turns out about 20 complete shells from a single set of dies



Hopper being lowered over die for dumping sand-resin mix. Mixture falls 1 foot to contact die



Oven, with infrared units, moves over shell to cure it. Bar on ovenfront strikes off excess sand

BECAUSE of its newness and advantages offered in the production of precision castings, the shell molding process has attracted wide attention in the past two or three years. Utilization of the process is growing rapidly but, unfortunately, a veil of secrecy continues to shroud much of the progress and procedures which some users have developed.

About two months ago, Powdered Metal Products Corp. of America, Franklin Park, Ill., announced that following experimental and development work carried out for more than a year it had facilities for producing precision castings by shell molding techniques and was supplying such castings on a contract basis. Now it has been announced further that its equipment and procedures are to be made available to industry. Significance of this is that use of the process can be undertaken without heavy expenditures for experimental and development work or equipment.

New In the Field — Powdered Metal Products was established as a new company in 1944 to make precision metal parts by powder metallurgy techniques. That it should become interested in making precision parts by the casting process as well might seem a bit incongruous. It is not.

In the first place, both processes require precision dies and extensive toolmaking facilities of similar character. The company had the necessary toolmaking facilities and the skilled know-how.

In the second place, the com-

pany discovered that users of precision powder metal parts also are buyers of precision cast metal parts. Thus, both types of products could be offered without modification of sales representation or customer clientele.

By way of review, the shell molding process is a method whereby a mixture of sand and thermosetting resins is baked on a precision metal pattern to form a permanent, precise, smooth finish mold. These molds are expendable, that is, destroyed in pouring.

The Advantages — Basic advantages of the process are: Precision — limits of plus or minus 0.0025-inch per inch can be maintained; finish — normal finish is approximately 125 microinches; low cost — about half as much as castings produced by other precision casting methods in some cases; ease of mold handling — the cured shell molds are permanent and can be stored indefinitely without loss of accuracy; simplicity of secondary operations — in most cases, shell mold castings can be cleaned up in a simple trimming die, and hard to cast alloys, like heat or shock-resistant steels and stainless steels, are accommodated easily.

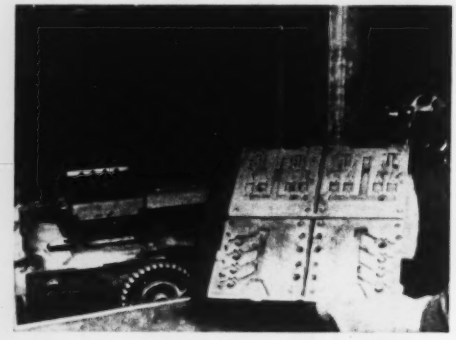
Main purpose of the development work which Powdered Metal Products undertook was to find practical, economical production processes and equipment for applying the shell molding technique. After numerous pilot runs employing various methods, G. L. Bachner, company president, designed and built a completely automatic machine which is capable of turning out approximately 20 complete shells per hour from a single set of dies. Through a series of push-buttons, the machine can be operated on a semiautomatic basis when desired.

It Does All the Jobs—This machine is the standout in the technique which the company has perfected. Simple and dependable in operation, it performs all steps of the shell molding operation, delivering finished shells for pouring or storage.

Occupying a floor area about 6 x 12 feet and standing 11 feet high, it requires no special foundation. Approximately 150 sq ft of floor space will accommodate a complete shell molding setup, exclusive of pouring. Power is 220-v ac with a compressed air supply.

Oven in position for curing the shell. After the curing period (about a minute) the oven retracts

Shell in foreground has just been produced and ejected from machine. Operation is all automatic



Maximum die size which the machine will accommodate is 12 x 18 inches, although larger can be provided for if necessary. With present bed size, dies 12 x 12, 6 x 12 or 6 x 6 inches can be used, either singly or in multiple.

Usual practice is to design dies so that cope and drag shells are made simultaneously. In other words, a single shell when broken in half makes one mold or when quartered makes two molds.

Furnace Rolls Over Dies—The bed of the machine on which the dies are mounted is the bottom of a frame which rotates through 180 degrees. Mounted above the bed and capable of being lowered and raised is a sand hopper 12 inches square and 36 inches tall containing 2 cu ft of sand.

Immediately back of bed and dies is a half cylinder infrared furnace which rolls forward over the dies for curing a shell and it retracts when curing is complete. Ejector pins in the die eject the shell for the operator to remove.

Dies are heated to approximately 450° F by cartridge-type resistance heating elements inserted in the die shoe, and are automatically maintained at the specified temperature. Likewise, the infrared baking furnace is automatically controlled.

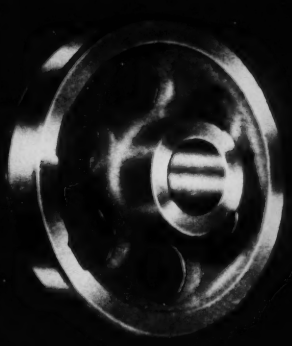
The Operation—To operate the machine in its automatic cycle, the operator inspects the die to see that it is clean, then sprays it with a water silicone mix. Pressing a starting button gives the following sequence of operations:

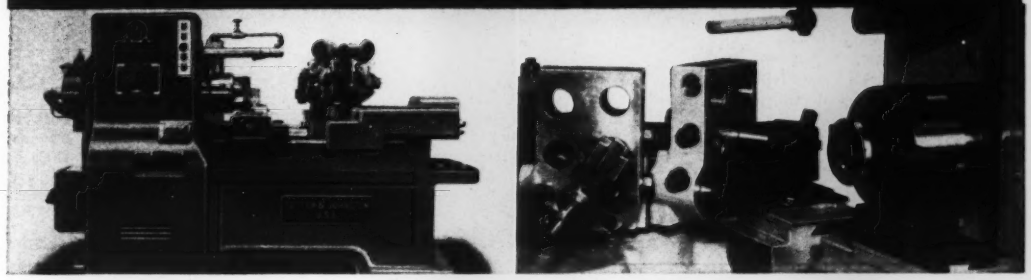
1. Sand hopper descends over die. 2. Sand valve in hopper opens and dumps mixture of sand and resin on heated die. The mixture falls about 1 foot and is held in contact with die for precisely timed

ONE OF THESE PIECES

EVERY 1.84 MINUTES

POTTER & JOHNSTON 3U *SPEED-FLEX*





High output with high precision on difficult jobs is the rule, not the exception, with industry's outstanding production team, Potter & Johnston Automatic Turret Lathes plus P & J Tooling. A job like that shown above is a good example, not because it's unusual, but because it's the sort of work the 3U takes in its stride. All machining operations on these phosphor bronze drive worm wheels are completed in one automatic cycle. They include both inner and outer rim faces as well as the inner end of the hub. Tolerances on some surfaces are held to five ten-thousandths of an inch. One operator easily handles a battery of machines, providing divided labor costs. Production of small, precision parts in your plant can similarly be speeded up — made more efficient. Send now for your copy of Bulletin 145 that fully illustrates and describes the Potter & Johnston 3U Speed-Flex Automatic. Ask P&J Tooling Engineers to make a time and cost estimate for your difficult jobs. They will work out the best possible tooling for better quality, lower costs and fewer rejects — and there is no obligation.

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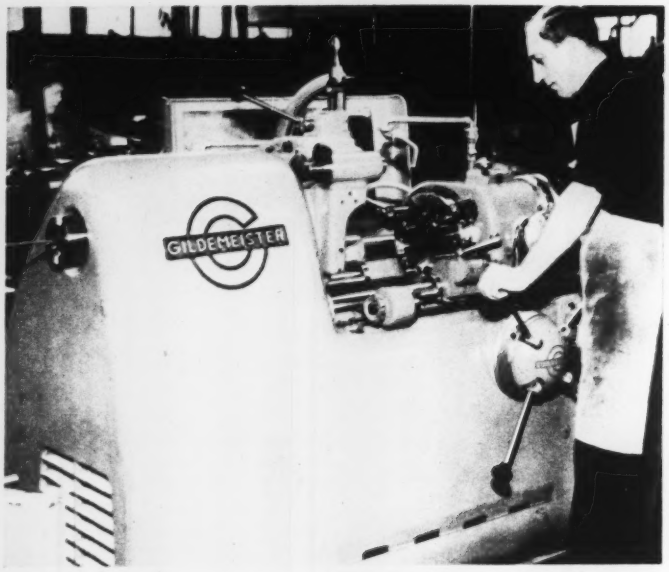
interval for contact surface to cure. 3. Safety pin pulls out to allow frame to roll over. 4. Frame rolls over 180 degrees. Die is now at top and sand hopper at bottom. Excess sand drops into hopper. 5. Sand valve closes. 6. Frame rolls back to original position. 7. Safety pin moves in to prevent frame from rolling over. 8. Sand hopper moves up. 9. Oven rolls forward over mold shell, its front edge striking off excess sand. Shell is cured about 1 minute to make it permanent. 10. Oven rolls back. 11. Ejector pins move up to eject shell from die. 12. Ejector pins return.

Melting Is Separate—Shells are now assembled into molds ready for pouring or are stored until needed. The company has housed its melting operations separately. Melting equipment consists of a 400-pound rocking type electric furnace for steel, stainless steel and special alloys; and 100 and 150-pound gas-fired tilting crucible furnaces for nonferrous metals. For gray iron, the molds are transported across the street to the plant of the Major Foundry Co., an arrangement which will be continued.

For pouring smaller molds, the 6 x 6-inch ones, for example, some 30 molds are clamped tightly in a light steel rack which two men carry to furnace spouts for direct pouring. Larger molds are clamped in structural steel frames mounted on rollers or placed on a section of conveyor for pouring.

Blends Own Resins—In its molding practice, the company uses special silica sand of 120 mesh, adding about 5 per cent resin binder and a wetting agent. It blends its own resins. Experience indicates that other factors in the shell molding process are more important than the resin binders.

In making its shell molding process available to industry, Powdered Metal Products recognizes that the machine is the most important feature. Present plans, therefore, are to furnish and install the machine at an initial cost of approximately $5000 and to rent it on a use basis of about $0.06 per cycle. In rendering complete service, the company will service the machine, instruct operators and, where required, build dies and furnish the necessary sand-resin mix.



Machine has drum-type turret with 16 available tool positions. One shop has found that it adapts itself well to difficult machining jobs. Speeds and feeds can be preset to engage automatically reducing operator fatigue

New Machine Eliminates One Operation

Availability of extra end-working positions permits both ends of a female ell to be machined in one setup. Manufacturer sees 20 per cent production boost

THEY'RE doing an old job by a new method and gaining about 20 per cent output at Special Screw Products Co., Bedford, O. Interesting part of the story is that there is no great reduction in actual machining time.

Operation is the machining of forged tees and ells, part of the Koncentrik flared tube line of fittings. These are made from types 316 and 347 stainless, Carpenter No. 20 and Monel.

Two Ends—For example, here's what they have to do to one of the female ells to turn out a finished part. One end is first start-drilled, then drilled, step counterbored and tapped—all end-working operations. Then the other end of the ell must be start-drilled, drilled, taper-reamed and pipe tapped. The two threads call for two different taps.

In addition to the above operations there are generally two facing operations to be performed. Previous practice was to machine first one end of the ell and then, after the lot had been finished, to resetup the machine for doing the second end. Reason for this requiring two separate setups was the eight end-working operations which had to be performed.

Two to One—Now they are doing both ends in the same setup on a Gildemeister RV 50 German lathe, imported by Kurt Orban Co. Inc., New York. The 16 stations on the drum-type turret of the Gildemeister make it possible to tool for end-working operations on both ends of the ell.

Also the two facing operations are performed from the turret under power index.

Forging is first chucked in one position and one end is machined. After this end is completed the

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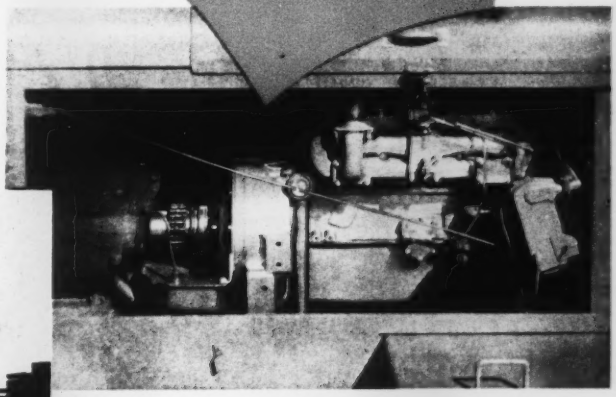
To a long line of improvements in design and construction, UNIT has added another advancement — FLUID TORQUE DRIVE. This torque converter application gives the operator a steady flow of power which he can regulate with smoothness and accuracy. Elimination of shock loads adds life to bearings, shafts, gears, and cables . . . brings maintenance costs down to a minimum. Excavating work is done with a strong steady flow of power, with no "stall" and no "delay" while the engine regains speed. Crane work can be done with greater smoothness of operation by throttle control.

UNIT offers the Chrysler Torque Converter as a standard installation at no extra cost on ½ yard machines equipped with 6 cylinder Chrysler Industrial Gasoline Engines.



UNIT 357 MOBILE CRANE

SMOOTHER PERFORMANCE — Smoothness of operation is achieved in traveling as well as in hoisting and digging. The Torque Converter in Mobile equipment allows for smooth break-away performance.

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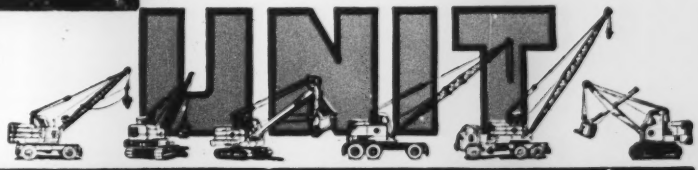
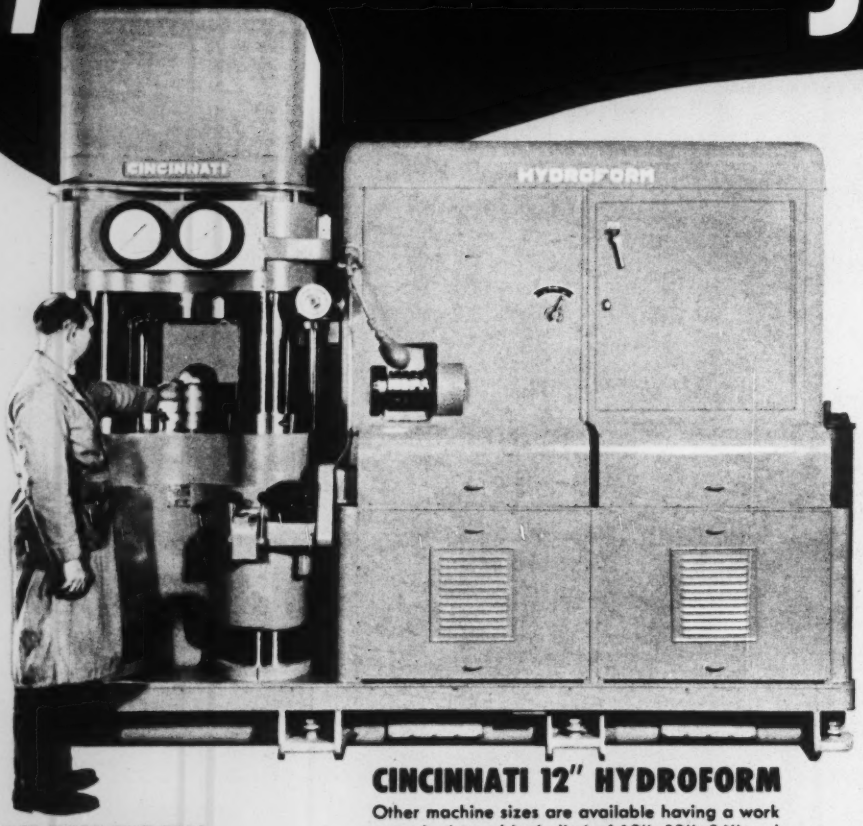


SHOVELS • DRAGLINES • CLAMSHELLS • CRANES • TRENCHOES • MAGNETS

Hydroforming

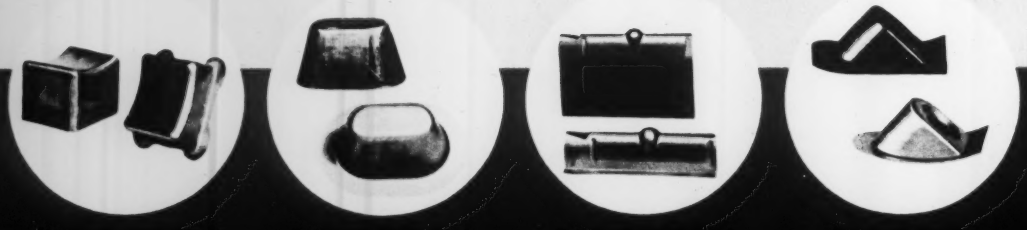


CINCINNATI 12" HYDROFORM

Other machine sizes are available having a work capacity (max. blank dia.) of 19", 23", 26" and 32". Information on machines of larger capacity furnished on request.

EASY-TO-PRODUCE MALE PUNCHES MATERIALLY REDUCE TOOL COSTS

Shown below are typical examples of the simplicity of Hydroform tooling.



cuts the cost of tooling for deep draw work

CINCINNATI

TOOL COSTS CAN RUN AS LOW AS 10% OF CONVENTIONAL DIE SET COSTS!

Hydroforming is deep drawing by use of a male punch working upward into a *flexible die member* . . . a built-in feature of the Cincinnati Hydroform that replaces *more than half* the parts of the conventional draw die.

Hydroform tooling consists simply of a punch of the desired shape, and a draw ring contoured to fit around the punch. Normal clearance between the punch and draw ring is 50% or more of the thickness of the material being formed—eliminating a costly die-maker's fit.

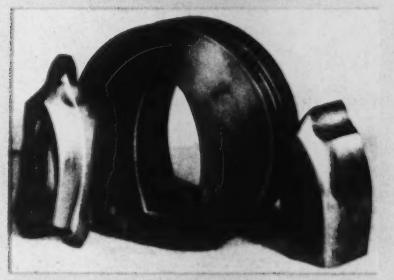
Punches can be made of untreated steel, cast iron, hard woods, Kirksite, brass, aluminum, or other easily worked materials, depending on the quantity and shape of the part. Punch maintenance is minimized as the cushioned action of the flexible die member reduces punch wear.

The tools are self-centering and easy to locate in the machine. Set-up and changeover of tooling is accomplished rapidly.

Low cost tooling is a major Hydroforming advantage. However, Hydroforming brings to deep drawing *many* other benefits:

- Most parts can be produced in a single draw—eliminating multiple operation processing.
- Practically any shape can be formed from a wide variety of materials up to steel ⅜" thick.
- Part quality is materially improved. Surface finish is unimpaired.

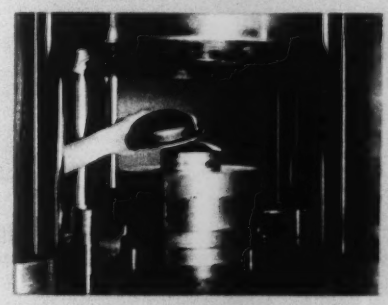
Investigate Hydroforming now. It will change your thinking on deep drawing and forming! Call in your nearest Cincinnati Milling Machine Co. field engineer for a factual discussion of how Hydroforming can cut the cost of your metal forming work. For detailed information on Hydroform machines and the Hydroforming principle, write for Bulletin M-1759.



PART DRAW RING PUNCH

Shown above are the basic elements of Hydroform tooling—a draw ring and punch.

A close-up view of tooling installed in the Hydroform is shown below. Only 7½ hours were required to produce the draw ring and punch from mild steel. The part shown is a high pressure vessel cap of ¼" mild steel, Hydroformed in one operation.



HERESITE

REG. U. S. PAT. OFFICE

LININGS FOR TANK CARS AND TRAILER TANKS

RESISTANCE—Heresite linings effectively prevent product contamination of such items as Sulphuric Acid, Rubber Latex, Formaldehyde, Battery Acid, Lactic Acid, Acetic Acid, Fruit Juices and Wine. These products can be delivered fresh and full strength, unchanged.

EASE OF CLEANING— Heresite lined tank cars are quickly cleaned by Steaming, Hot Water, or any type of Solvent Wash.

HERECROL

REG. U. S. PAT. OFFICE

SYNTHETIC RUBBER LINING
The strongest caustic hydroxide solutions, as well as the halogen acids and other chemicals, may be transported in a HERECROL lined tank car or trailer tank. Our literature will interest you. Write for it today.

HERESITE & CHEMICAL COMPANY
MANITOWOC, WISCONSIN

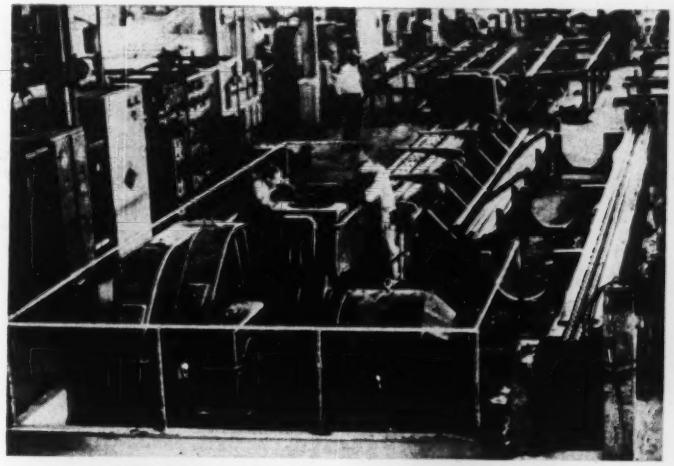
machine is stopped, the part rechucked, and the second end is completed.

Less Handling—Big advantage here is that when the part comes off the machine it is finished. There is no need for storing of semifinished parts while the machine is being setup for a second operation. Also some materials handling time is eliminated since the finished parts are taken directly to inspection instead of being taken to storage, returned to the machine and then moved to inspection.

According to D. M. Douglas, plant manager, there is about a 20 per cent gain in production with the new machine. This is due primarily to the reduction of handling time already mentioned. Another factor, however, is that of operator fatigue.

Mr. Douglas says that since the Gildemeister has an automatic electro-hydraulic preselection of feeds and speeds, there is less machine-handling for the operator to do.

Thus far, in almost every case, standard American tools have been adapted to the machine with no difficulty. Adaptability of the machine is being proved as other problem jobs are assigned to it.



COMPLETED DRAWBENCH UPS WESTERN POTENTIAL
. . . handles carbon and alloy steels in all grades

New Draw Capacity Fills Western Need

Sierra Drawn Steel's 100,000-pound capacity machine is the first on the coast capable of pulling 4½-inch rounds. McKay of Youngstown is the builder

ADDED IMPETUS to expanding West Coast industry should come from a 100,000-pound capacity drawbench completed this month by Sierra Drawn Steel Corp., Los Angeles.

Manufactured by the McKay Machine Co., Youngstown, the big bench handles carbon and alloy steel in all grades, including heat treated stock. It produces round, hexagon and all other shapes.

According to Fred J. Roberts, Sierra president, the McKay drawbench is the only one of its type on the West Coast able to pull 4½-inch rounds. These are often used in making large shafting and for sprockets, disks, die blanks and similar products.

Stock Speed: 60 to 100 fpm — With its 100,000-pound pull capacity the new machine draws a 4½-inch bar singly, two bars at a time 2½ inches diameter or three 1¼-inch diameter bars at a time, plus comparable squares, flats or hexagons. A hydraulic pushhead exerting 2500 to 3000 psi pressure feeds bar stock to the die. After penetrating the die 6 to 8 inches, grippers grasp the extruded stock and continue the pull to complete the shape.

Draw carriage reaches a speed of 100 fpm in 4 feet or less travel after grasping the stock as it first comes from the die. Drawn stock emerges at the rate of 60 to 100 fpm, depending on size.

Automatic Operations — Weight of the installation is almost 50 tons; length of the drawbench itself is 54 feet and width, 16 feet. Feed racks 30 feet long make an overall length of 84 feet.

Several automatic operations serve to increase speed and versatility. These include automatic carriage return to the die and automatic hydraulic arms to throw off the shape after it is drawn. When stock completes its run through the die and carriage is returned for another piece of bar stock, gripping devices on the carriage automatically grasp the next bar to be fed through.

Further automaticity is seen when, after completion of its travel through the die, automatic throw-off arms place the shape onto a storage rack. From there it is transported by crane to the straightening and polishing machines.

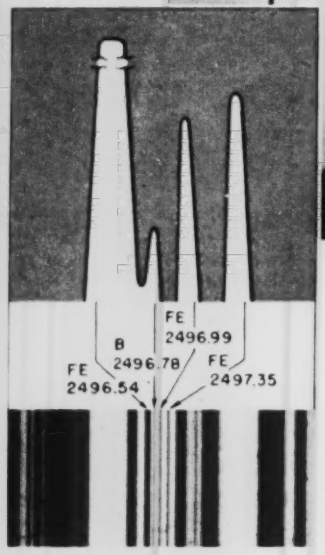
Integral Pushpointer—The machine is equipped with an integral and automatic pushpointer which has a push capacity corresponding to 230,000 pounds. This enables bars to be pushed through the die and eliminates necessity of prepointing before the draw.

Power is supplied by a 200-hp dc motor. Line current is converted from 440-v, 3-phase, 60-cycle to 230-v dc, 800 amp through rectifying equipment built by Inet Inc., Los Angeles.

New Line Acquired

Hoffman Co., York, Pa., announces the acquirement of the Davis Metal Scraper Co., York, together with all manufacturing and sales rights to the Eierman floor and roof scraper which the Davis Co., has been producing for the past several years.

General view of the laboratory installation. New excitation unit is in the center, flanked by a spectrograph cabinet at left and the densitometer at right



Rare picture of the 0.0004 per cent boron line in SAE 1041 steel spectrum. Line at top is densitometer tracing

New Spectrochemical Excitation Unit:

A Key to Essential Control in Boron Steels

The inherent potentialities of boron steels depend directly on industry's capacity to accurately analyze trace amounts of the element. This spectrochemical method will do it

By J. T. ROZSA and L. E. ZEEB
National Spectrographic Laboratories Inc.
Cleveland

SMOKING OUT the trace elements in steel may become an important part of the treating process. Quantities of some, such as boron, which have heretofore been too small to recognize can have an effect on the subsequent treating processes. Now we can analyze these small quantities quickly with a spectrograph. Here's the story.

The steel industry today is faced with the problem of reduced availability of nickel, chromium, molybdenum, and manganese as alloying elements for intermediate carbon steels.

War Baby—This acute problem arose during World War II through the reduction of foreign supplies and continued in post war years from increase in alloying composition required for high temperature applications. One method of retaining the hardenability of the carbon steels and reducing the amount of alloying constituents is the addition of trace amounts of boron.

Amount of boron necessary to provide the desired hardenability in steels has been within the range of 0.0005 to 0.005 per cent. During the last few years, however, investigational work on these types of alloys has indicated that minimum values of 0.0001 per cent boron could also affect the hardenability. It is necessary, therefore to have rapid accurate analytical methods for analyses in this concentration range.

Faster Method — Analysis for boron by the normal chemical methods in this concentration range is time consuming and tedious whereas use of the spectrographic method has provided a

The Mark of Sound Engineering . . .

FOR

BLAST FURNACES

SINTERING PLANTS

OPEN HEARTH SHOPS

ROLLING MILLS

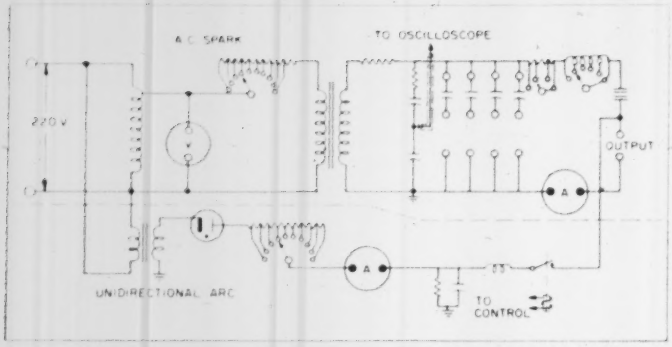
THIS is the mark of McKee engineering. To steel men all over the world it means sound plant design and thorough, efficient engineering and construction. McKee experience covers almost half a century of design and construction of all types of iron and steel plants and auxiliary equipment including sintering plants and other ore preparation facilities. McKee services are backed by an organization with the scope and resources to undertake your project and fulfill the promise that *McKee Engineering means assured results.*

DESIGN, ENGINEERING AND CONSTRUCTION FOR THE IRON AND STEEL AND PETROLEUM REFINING INDUSTRIES

McKee *Engineering*

Arthur G. McKee & Company • Established 1905

Headquarters: McKee Building, 2300 Chester Avenue, Cleveland 1, Ohio. *New York Office:* 30 Rockefeller Plaza, New York 20, N.Y. • *Washington Office:* 1507 M Street, N. W. Washington, D. C. • *England:* The Iron and Steel Division of Arthur G. McKee & Company is represented by Head, Wrightson & Company, Ltd. *District Engineering Offices:* Union, New Jersey and Tulsa, Oklahoma.



Schematic diagram of the source of excitation. Area below the dotted line is unidirectional arc section. Upper area is high voltage spark ignition

technique for rapid, accurate analyses with a minimum sample size required. A tremendous number of spectrographic determinations for boron were performed during the last war by the point-to-plane technique in the range of 0.0006 to 0.019 per cent using this concentration range provided by the U. S. Bureau of Standards.

Method was limited to this lower level of 0.0006 per cent by the type of excitation sources used for the analyses and the ratio of line density to background fogging encountered from continuous radiation of the electrodes. To obtain lower levels of sensitivity, it was necessary to develop a source of excitation which would reduce the amount of background to line density ratio.

The Dilemma—Normally in spectrographic analyses, it is possible to choose element spectral lines which are relatively free of interference from other element lines and background. In the case of boron, however, a choice of other analytical spectral lines is not possible since boron has only two spectral lines of suitable density for this concentration range.

One of these spectral lines, boron 2497.7 has serious interference from an iron line too close to be resolved by normal operating conditions on the commercially available spectrographs. The second line boron 2496.78, requires the use of high resolution and dispersion spectrographs since it has a strong iron line which is only 0.21 angstroms away. Therefore, it is necessary to adjust the excitation of the sample and employ the optimum characteristics of the spectrograph to use the one line of boron (2496.78) which is present.

Two Ways—The problem resolved itself to obtain a method whereby fogging background radiation could be reduced by one or both of the following methods. First, the iron spectrum could be suppressed by the use of an alkali earth salt coating on the sample surface. This type of sample preparation was subject to contamination and was time consuming. Second, the excitation of the sample could be changed to obtain this suppression of the iron lines.

In the point-to-plane technique a flat portion of the sample is used as one electrode and a graphite rod with a 120-degree cone or hemispherical tip is the counter electrode. This technique is especially useful for inspection purposes where pin type samples are unobtainable. Only requirement is a minimum size which must be maintained.

Speed Factor — Excitation generally used is an alternating or direct current arc or over-damped condenser discharge source. It was quite common to use exposures of 3 to 5 minute duration in order to obtain suitable line densities. Accuracy with the dc arc is generally not as good as with the ac arc because of the greater skill in technique required.

Most productive method of excitation to date has been the over-damped discharge source despite the background, long exposure and moderate sensitivity. The factor of inherent speed of the spectrograph is also important since the relationship of the signal to noise or line to background is obviously distorted by long exposures to effect higher background and hence lower sensitivity.

The conventional Duffendack-Thompson ac arc and the ignited ac arc both presented some of the same problems.

Reasons for this were assumed to be the counter electrode contamination by iron and the fact that the polarity changes each one-half cycle to provide a secondary sample of condensed iron on the carbon electrode.

Modified Source—This increased the iron line density without increasing the boron line density and also provided background from the carbon. It was therefore deemed feasible that a source of excitation that would reduce the counter electrode contamination would provide higher boron to background ratios and provide lower levels of sensitivity. The source of excitation which has been developed is a modification of the low voltage ignited ac arc to provide a discharge that is in agreement with the assumption made previously of the mechanism necessary to reduce the background.

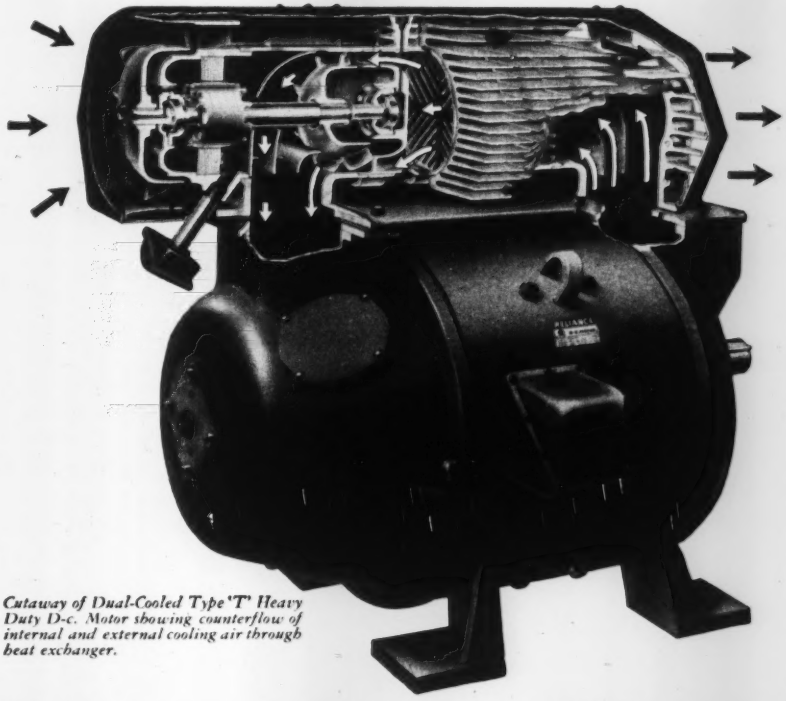
The source provides a low-voltage pulsating unidirectional arc which is ignited by the high voltage spark every alternate half cycle. The primary resistance controls the peak amperage and the number of weak spark discharges controls the duration of the current flow.

In Accord—In investigating the validity of the new source the laboratory was fortunate in having two sets of boron in steel standards available. One set, covering the range 0.0006 to 0.019 per cent boron, is sold by the U. S. Bureau of Standards. The other set, loaned to us by a large industrial laboratory, provided a range of 0.0001 to 0.0031 per cent boron chemically and from zero to 0.0042 per cent boron spectrographically.

Throughout the higher range of concentrations excellent agreement was obtained between the two sets

RELIANCE *Totally-Enclosed* *Dual-Cooled* D-C. MOTORS

PATENT APPLIED FOR



Cutaway of Dual-Cooled Type 'T' Heavy Duty D-c. Motor showing counterflow of internal and external cooling air through heat exchanger.

for Wider Speed Ranges... Higher Ratings

New Reliance Dual-Cooled Motors provide dependable totally-enclosed, fan-cooled operation over wider speed ranges and higher ratings than were ever before possible . . . and this is accomplished with floor-space savings of up to 30%!

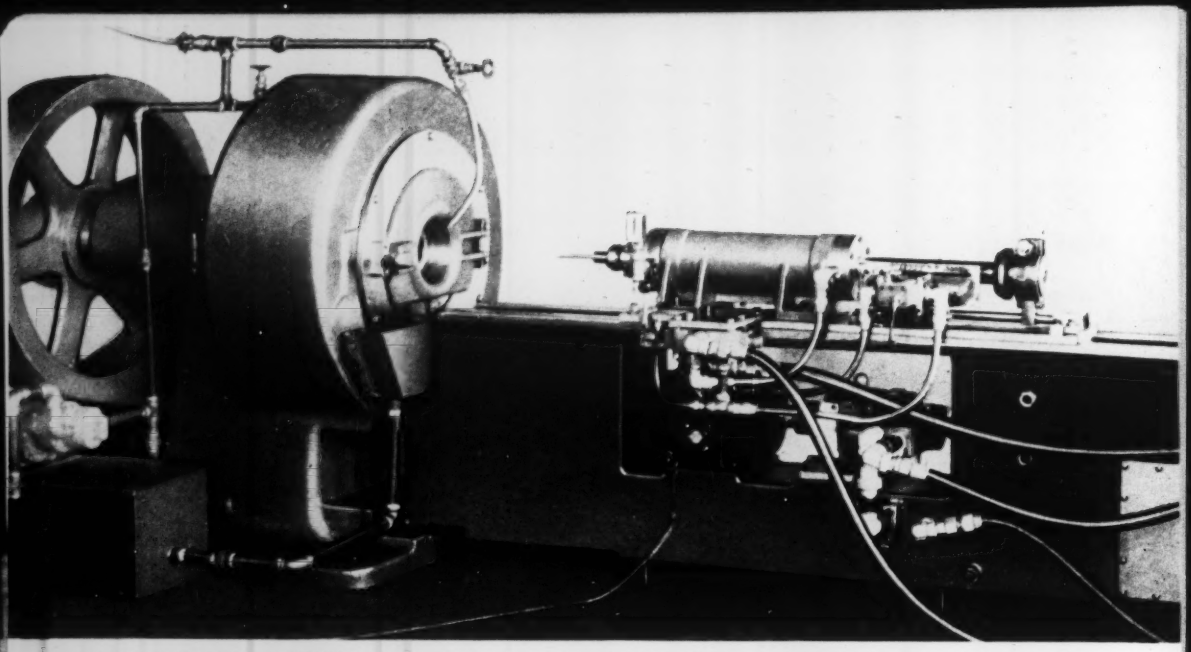
Dual-Cooled Motors are completely enclosed... have two separate cooling systems operating independently of the motor speed. One system circulates high-velocity air within the motor, that is cooled in the finned inner duct of the heat exchanger. This heat is dissipated in the other system by air sweeping through the fins of the outer duct.

The Dual-Cooled Motor is especially adaptable to Reliance adjustable-voltage V•S Drive and is available in ratings from 15 through 150 horsepower. Explosion-proof Dual-Cooled Motors are available through 100 hp., in conformity with Underwriters and Bureau of Mines specifications.

Whatever your application . . . get further details from the nearest Reliance Sales Office . . . or write for Bulletin C-2201.

RELIANCE ELECTRIC AND ENGINEERING CO.

1061 Ivanhoe Road, Cleveland 10, Ohio • Sales Representatives in Principal Cities



FENN SWAGING MACHINE, featuring hydraulic feed, automatic chucking, and oil-cooled dies, is fast replacing lathes and screw machines for shaping a wide range of metal parts because it . . .

MAKES METAL GO TWICE AS FAR

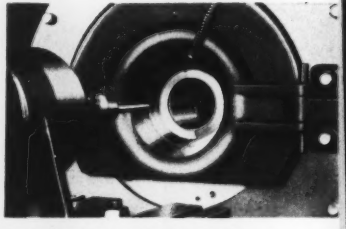
Yes, you can cut your metal requirements in half, in many cases, with this Fenn Swaging Machine. That's because it doubles the length of the blanks it shapes . . . with absolutely no stock removal.

MANY OTHER ADVANTAGES

What's more, this Fenn Swager produces a denser structure in metal parts . . . maintains concentricity . . . gives an improved finish . . . requiring no subsequent grinding . . . calls for less operator skill than any other machine capable of producing equivalent parts.

WRITE FOR SPECIFICATIONS

It will pay you to investigate all the cost-cutting, material-saving advantages of the Fenn Swager. Contact the Fenn distributor nearest you for facts and delivery schedules, or write direct to THE FENN MANUFACTURING COMPANY, 1847 Broad St., Hartford 1, Conn.



SIMPLE DIE CHANGES, using blanks in various diameters, make Fenn Swaging Machines quickly and easily adaptable to a wide variety of jobs. You can use them for reducing, pointing, or forming bar stock or tubing. Also for assembling fittings to cables. Fenn Swagers and Hydro-Formers come in sizes and designs for every swaging need.

FENN

Shaping metal for better and stronger products at lower cost

FENN MACHINES ARE SOLD BY:

ATLANTA
J. R. Walraven
BALTIMORE
Refer. Calco Mach'y Co., Phila.
BIRMINGHAM
Quinn & Quinn
BOSTON
Refer. C. Toolin, Providence
BUFFALO
Syracuse Supply Co.
CHICAGO
Neff Kohlbusch & Bissell, Inc.
CINCINNATI
The Seifreat-Elstad Machinery Co.
CLEVELAND
Wm. K. Stamets Co.
COLUMBUS
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DALLAS
C. J. Harter, Machinery
DAYTON
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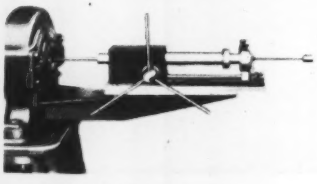


FENN FEEDING DEVICES, either manually or hydraulically operated, are available for all sizes of swagers. They speed up production and reduce operator fatigue.

SPECTROCHEMICAL METHOD

Sample	Minimum size ½" dia. by ¼" thick		
Sample Preparation	Clean uncontaminated flat area ground by 80 grit grinding wheel or belt sander		
Counter Electrode	Hemispherical top, ¼" dia. pure graphite as cathode		
Ignition (A. C. Spark)	Capacitance		0012uF
	Inductance		OuH
	Resistance, secondary		0 ohms
	Condenser discharges per half cycle		1
	Condenser discharges voltage		16,000
Power (Unidirectional Arc)	Secondary amperage 6.2 amp		
Analytical Gap	2 mm		
Spectrograph	Type		Large quartz prism
	Total Exposure Time		20 sec
	Pre-Exposure Time		0 sec
	Slit Width		20 microns
	Source to Slit		25 cm
	Plates		SA #1
Densitometry	Spectral Lines:	Boron 2496.78 / Iron 2496.99	Range 0.0001-0.002
		Boron 2496.78 / Iron 2487.07	0.002-0.02
	Filter:	100/10	
	Background correction for values less than 0.0003%		

of standards and a straight line working curve was obtained. The lowest standard had been analyzed spectrographically by an overdamped discharge and designated as "no boron present" while a nominal value of 0.0001 per cent boron had been found chemically. Extrapolated value found by use of the unidirectional discharge was 0.00005 per cent boron under conditions that are listed in the accompanying table. This value has since been confirmed by several of the spectrographers of the industrial laboratory from plates provided by the laboratory.

Short Exposure—It was found during this investigation that short exposure times of only 20 seconds would provide adequate line densities for quantitative analysis. These short exposures provide more rapid analyses than by earlier methods. This investigation has shown that the method is accurate to the first significant figure for concentrations below 0.010 per cent boron. Refinements of technique will undoubtedly improve this accuracy.

Preliminary evaluation of this type of excitation disclosed the following advantages:

High sensitivity is present for low concentrations because of background reduction and relative low heating of counter electrodes.

Short exposure times of 20 seconds increase speed of analysis.

Sample preparation is reduced to a minimum.

Sample size may be small without danger of overheating.

Reproducibility studies show a high degree of precision.

Investigation of the application of the unidirectional arc to similar problems in both ferrous and nonferrous alloys is very promising but study has not reached the stage to justify further conclusions.

Tester Meets Tough Specs

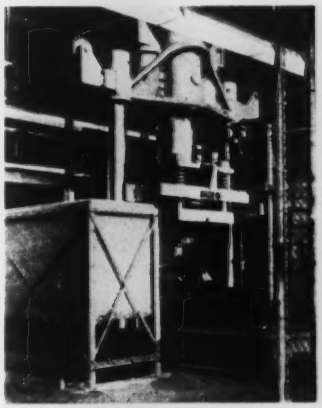
Modified machine has 600,000 pound compression capacity for aircraft landing gear

SPECIAL specifications required for testing hydraulic aircraft landing gear are met with a testing machine built and installed for Menasco Mfg. Co., Burbank, Calif. Specifications were developed through co-operation between Baldwin-Lima-Hamilton Corp.'s testing equipment department and Menasco production engineers.

The 600,000-pound compression tester consists of a hydraulic loading cylinder mounted as a fixed crosshead on two 9-inch diameter steel columns set in a bed plate at floor level. Loads are applied by a 21-inch diameter ram with 4-foot stroke and two speeds.

Speed of Application—Load can be applied at 0 to 6 inches per minute and the approach speed is 0 to 30 inches per minute. Clear space in the machine is 6 feet vertically and 6 feet between the columns.

To duplicate the action of single ram machines for load holding and instantaneous return, two concrete block counterweights weighing 10,000 pounds each (about 72 cu ft) are used in place of the customary pull-back cylinders. Large, double roller chains running over sheaves on top of the crosshead support the concrete blocks on the column sides.



CONCRETE COUNTERWEIGHTS
. . . *replace pull-back cylinders*

Three Ranges—The tester has three ranges: 0 to 600,000 pounds; 0 to 120,000 pounds; and 0 to 30,000 pounds. Three 16-inch diameter dials on the control cabinet outside the cage enclosure indicate loads. An independent hydraulic weighing system consists of three Bourdon gages in each indicator connected with an Emery cell on the end of the ram.

Sheet Slicer Is Hand Held

Cuts through sheet metal at the rate of 5 feet per minute. That's the capacity of electric hand shears of Victor J. Krieg Inc., New York, U. S. representative for Scintilla Ltd., Switzerland.

Shears will perform on all types of sheet metal work up to 16 gage. Power tool weighs only 3¼-pounds and operates on alternating or direct current.

WHAT *Life-Lines* REALLY DELIVER IS MORE SERVICE...LESS SERVICING

What *Life-Lines* really deliver is

...more service
...less servicing

"We can't afford equipment breakdowns. We manufacture ice cream making machinery and operate franchise stores throughout the country. Store operators know very little about maintenance. We *must* select equipment that assures trouble-free performance with minimum maintenance. That's what Life-Lines give us. That's why we standardize on them."

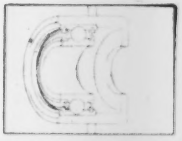
The above statement by the chief engineer of an eastern manufacturing plant tells the Life-Line story best. Summed up it means more service, less servicing with Life-Lines.

Take the Life-Linestarter®, for example. Contacts last longer because exclusive "De-ion®" arc extinction snuffs out arcs fast... reduces contact pitting. Simple seesaw balance of clapper prevents accidental opening; kickout spring prevents accidental closing. Compare with any other starter and see why Life-Linestarters offer *more service with less servicing.*

The Life-Line motor's advance design completely eliminates periodic lubrication. Pre-lubricated factory-sealed ball bearings need no greasing attention. Throw your grease guns away! Further, steel construction cuts breakage from rough usage. Superior insulation and winding techniques lengthen electrical life. On-the-job reports of a half million Life-Lines show why you get more service with less servicing.

It costs no more to get Life-Line performance. Ask your Westinghouse representative for details or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Penna.

J-21684



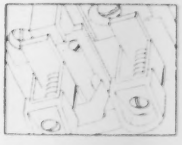
MOTOR

Needs no lubrication. Pre-lubricated factory-sealed bearings eliminate troubles due to under or overlubrication, dust and dirt.

Cuts winding burnouts. Pear-shaped slot design eliminates pockets. No corner voids remain to collect dirt, moisture.

STARTER

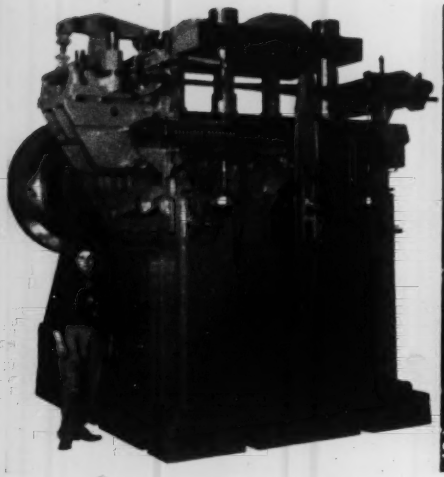
Never Jams. No sliding surfaces to wear—no sticking—no jamming—nothing to wear or replace.



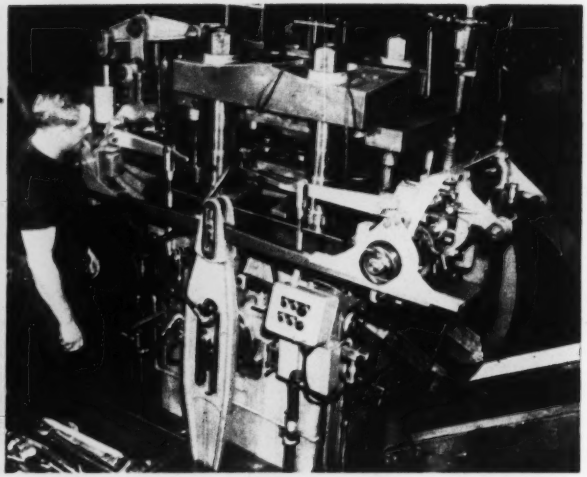
Never needs filing. Silver-to-silver contacts eliminate filing. Discolored silver maintains high conductivity.

YOU CAN BE SURE...IF IT'S Westinghouse

Life-Line MOTORS and CONTROLS



The 350-ton dieing machine recently installed in an automotive plant. Coil stock is used



This view shows the working area of a 150-ton dieing machine. It produces muffler heads, 75 per minute

Progressive Stampings—One a Second

Dieing machine with a 350-ton capacity turns out completed gear casings, one right and one left, 60 times a minute. Automotive company uses it on many jobs

TURNING OUT various stampings from multiple station progressive dies, a 350-ton dieing machine has boosted production at an automotive plant. Machine was made by Henry & Wright, Hartford, Conn.

Example of the work the machine is doing are the right and left-hand gear casings. Two completed casings, one right and one left, are produced at each stroke from $\frac{1}{16}$-inch by 12-inch cold rolled steel in coil form. Machine operates at a speed of 60 strokes per minute.

Features—The machine has a 6-inch stroke, single geared drive, but is available with any stroke up to 16 inches.

List of standard equipment on this machine is: Automatic double roll feed, adjustable scrap cutter attachment, motor driven mechanical lubricator, pneumatically actuated friction clutch, pneumatic counterbalance for reciprocating parts with no member extending below the bottom of the floor plate, motor driven adjustment for varying tool height, variable speed drive with range of 30 to 60 strokes per minute, pneumatic lift for upper feed rolls and pneumatically actuated flywheel brake.

Corrosion Engineer Valuable

Ten times his salary—that's what a good corrosion engineer can save for his company, F. L. LaQue, head of Inco corrosion engineering section, International Nickel Co., told some 300 research executives and other engineers of northeastern Ohio, attending a corrosion forum, co-sponsored by International Nickel and Williams & Co. Inc., at the latter's plant in Cleveland.

Mr. LaQue briefly outlined the corrosion engineer's orbit, what his responsibilities were and how he could conduct an effective campaign against corrosion.

The meeting, which was opened by J. H. Penske, manager, Williams & Co., included discussions on fighting corrosion in the petroleum and petro-chemical industry, alloys for high temperature uses and their behavior, fabrication and thermal treatment of nickel alloys. Other highlights were a film on Harbor Island testing station and a new movie "Corrosion in Action" which pointed out how corrosion works to extort $6 billion annually throughout industry.

Safe Transit Program Expands

Certification of eight new companies under its program to reduce damage to products in transit is announced by the National Safe Transit Committee, Washington. The committee, originated in 1948 by the Porcelain Enamel Institute, bases its approach to the damage problem on preshipment tests that simulate transit conditions.

Another welcome assist to the committee's work, according to secretary John C. Oliver, was a recent offer by American Standards Association to extend its services and facilities to further the safe transit program.

Latest firms certified are Standard Control Division, Westinghouse Electric Corp., Beaver, Pa.; Bryant Heater Division, Affiliated Gas Equipment Inc., Indianapolis; Samuel Stamping & Enameling Co., Chattanooga, Tenn.; Jordan Refrigerator Co. Inc., Philadelphia; Barrows Porcelain Enamel Co., Cincinnati; Malsbury Mfg. Co., Oakland, Calif.; Geneva Modern Kitchens Inc., Geneva, Ill.; and Victor Products Corp., Hagerstown, Md.

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Steelmaking Processes Re-examined

Latest trends in operating techniques and administrative organization discussed at Association of Iron and Steel Engineers technical sessions

TECHNICAL papers presented at the annual convention of the Association of Iron & Steel Engineers, Public Auditorium, Cleveland, Sept. 30 to Oct. 3 covered many phases of iron and steel production, engineering and maintenance. Sessions held concurrently with the 1952 exposition in the Cleveland Public Auditorium were divided into separate morning and afternoon programs to permit those attending to hear discussions on preferred subjects and also to view all exhibits. Digests of some of the papers follow:

Replacements for Palm Oil in Cold Rolling Steel, by Robert C. Williams, director of research, Ironsides Co., Columbus, O.

World War II intensified the efforts to find a workable domestic replacement for imported palm oil which has been widely used for rolling tin plate since the start of the industry. Not only enemy action, in the recent world conflict, but the ensuing and still current unstable international situation stimulated research to develop a satisfactory replacement. Many tin plate operators will recall the rigid controls over the use of palm oil during the recent war years, and others will recall that it was taken off the market for all but essential uses.

Reports from the Commerce Department show that some 30,000,000 pounds of palm oil are used annually by the tin plate industry and for other metalworking applications. A large percentage of this quantity is used by tin plate operations alone.

This volume includes not only the palm oil used in rolling but also on the tin pots. With the progress of electrolytic tinning a decreasing proportion of palm oil has been used on tin pots.

Replacement for palm oil should meet the following requirements:

1. It should be of domestic origin so as to avoid overseas shipment and foreign controlled sources.
2. It should be available in ample quantity.
3. It should be reproducible to specifications and be subjecet to chemical control.
4. It should do the job of palm oil as well or better.

For many years palm oil has been successfully replaced for many cold rolling applications.

Recent Developments—More recently sperm oil has been successfully used to some extent as a tin plate rolling lubricant as well as for other cold rolling jobs. As a highly desirable replacement for palm oil, it falls short in that it is not of domestic origin and its production is subject to enemy action in time of war.

While palm oil is not necessarily the ultimate in rolling lubricants, the successful replacement might well be designed to duplicate, essentially, its chemical and physical properties. A study of the composition and properties of palm oil indicated that it should be possible to produce a material which would closely duplicate palm oil through the use of available, domestic raw materials. The replacement for palm oil designed with this in mind is designated as No. 1B.

Doing the Job—First cold rolling tests were carried out on 18-8 stainless steel. Performance was satisfactory. After repeated production experience, which proved that the chemical control of the processing of No. 1B was reproducible, a trial run on rolling tin plate was proposed with reasonable confidence. After the chemical laboratory at the steel mill was satisfied that the No. 1B substantially duplicated palm oil a two hour run was made.

The No. 1B was applied to the strip at the pickle line as well as on the tandem mill. The handling throughout was the same as with palm oil. No changes in procedure were required. The results were comparable throughout. The reductions, mill loads, finish, washing, annealing, temper rolling and tinning, both electrolytic and hot dip, were comparable and satisfactory in all respects.

Controlled Free Fatty Acid Content—The free fatty acid content of the No. 1B can be controlled to plus or minus 0.5 per cent at the request of the mill operator. It will be readily appreciated that experimenting with lots of lubricant having extremes in free fatty acid content could be an expensive gamble when dealing with production mills. No performance data is therefore available regarding lots having free fatty acid contents of less than 8 or more than 14 per cent.

Further Tests and Uses—As a result of the early successful mill tests No. 1B has been now tested or is in use in a majority of the tin plate mills in this country and Canada. Regular production of No. 1B has reached a substantial figure. Tests have been made involving all forms of application: Direct solution and proportioning pump mixing with water. Results have been uniformly good and in some cases superior to palm oil. It is believed that uniformity of the No. 1B, made with customer specified free fatty acid content, eliminates variables in performance which are occasionally encountered with palm oil. Experience in some mills has shown lower consumption as compared with palm oil, gage is reached sooner on starting up and shape is held better. Tonnage increases have not been uncommon.

It is probable that further improvements will be made, since it is hardly possible that natural palm oil could have all the virtues of the ultimate in rolling lubrication. The engineering advances in cold rolling always keep the ultimate ahead.

High Speed Mills and Their Application to Ferrous and Nonferrous Rolling, by George Perrault, Jr., E. W. Bliss Co., Salem, O.

It was not until a combination of developments, such as metallurgical advancements, improvements in mechanical and electrical designs, crying needs for expedients of economy and decision to take carefully calculated risks, that many refinements, including in-

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You can get it now! . . . and we believe it's the best spring steel we've ever made

OUR NEW specialty spring steel plant is in full swing. Equipped with today's most modern, precision machines, we believe we're producing flat spring steel that gives more for your money than ever before.

This new spring steel is tops in uniformity. It saves you preparation time . . . cuts down machine stoppages . . . gives you the greatest number of perfect parts from every foot and pound of steel.

With our greatly increased capacity we can make prompt deliveries on flat spring steel. And if you need high carbon round or shaped wire, ask what we can do. John A. Roebling's Sons Company, Trenton 2, N. J.

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creased speeds, were incorporated into new mills.

This emphasis was not solely satisfied by actual direct mill speed-ups, but also by exacting simple, mechanized, efficient methods of handling materials, flowing to and from the mills. Result is today that we have many mills which have been speeded up, either by improved material handling methods, or by actual speeding up of the mill and its auxiliaries, or both.

Prize Examples — Among the mills now in actual operation, the fastest is a two-stand tandem tin temper mill for operation at a top speed of 7200 fpm. Another is a five-stand tandem mill operating at a top speed of 5200 fpm, for cold reduction work. Furthermore, it is not difficult to locate quite a few mills operating at 3700 fpm or more. Still more interesting is the recently publicized report of a new five-stand tandem mill about to go into operation, which is designed for 7850 fpm, or 90 mph.

Most repeated question among engineers is: "Are such speeds practical and justified?" This can objectively be answered most reliably by examining the production and operating costs records; and, among high speed mills so far set into operation, the young records would indicate that high speeds are indeed justified, provided other factors are considered.

Not Cheap—High speed mills, doing more work in a given unit of time, require more harnessed power, therefore greater electrical equipment investment. Such an investment and the extra required mechanical investment for machining refinements, top quality bearings, dynamic balancing of rotating parts, etc., is sound provided other conditions are altered to keep pace, so to speak, and afford maximum advantages.

First of all, where coils are involved, these must be enlarged by building them up through splicing ordinary sized coils, to realize more full use of the mill, once fully accelerated in rolling. In other words, the ratio of coil handling time to contact (or rolling) time, must be reduced.

Nonferrous Too — High speed mills are not limited to ferrous rolling. The nonferrous producers

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OF VISION

Their future is based on decisions made today. The secret of success at Indiana Gear is to visualize . . . create . . . prove . . . and then move on to conquer the next problem. Indiana Gear proves from past success in a highly competitive business that its policy of using master craftsmen, fine equipment, skilled subcontractors, and "young men of vision," exemplifies the perfectly coordinated planning so necessary to solve the gear problems of today.

INDIANA GEAR

The driven gear shown here is 5" in pitch diameter and 15" long overall. It is carburized and hardened with heat-treating distortion held within .001".

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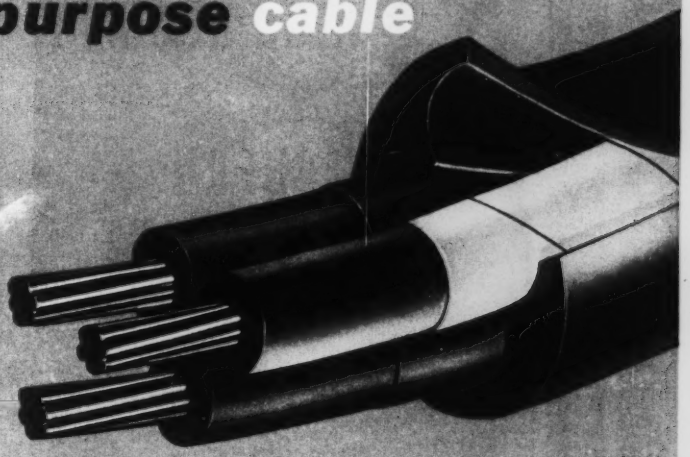
Durasheath

the ***all-purpose*** *cable*

for both power and light services



Durasheath's* tough neoprene jacket stubbornly resists electrolysis, corrosion, temperature extremes, cutting, abrasion, impact, flame, oil, grease, moisture and most soil acids and alkalies.

Run it overhead, in ducts, or buried underground—or all three in one continuous run.

It's flexible, easy to handle, economical to install; made in single or multi-conductor construction.

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LOW CARBON • HIGH CARBON • ALLOY • STAINLESS • STRIP AND TUBING

UNIFORM HIGH QUALITY *Demands* MODERN EQUIPMENT

Production of steel strip and tubing to meet modern industry's rigid specifications demands the most modern equipment. During the last 30 years, The Wallingford Steel Co. has kept pace with developments in both machinery and techniques by sponsoring a continuous program of replacement and improvement. Today, not one piece of original equipment is still in use. The two-stand, four-high tandem rolling mill shown above is an outstanding example of the many precision built production machines in our completely equipped plant. Electrolux continuous mill gauges provide a constant check in holding strip to extremely close tolerance.

THE WALLINGFORD STEEL CO.
SINCE 1922
WALLINGFORD, CONNECTICUT, U.S.A.

likewise have come to recognize the importance of speed; to be fair about it, they recognized the merit of higher mill speeds long ago, but it was only after the chief problem of heat removal from the strip had been licked, that they could make the jump into the speedier mill classification.

Today, however, we find several aluminum mills operating at 3000 fpm, and brass mills operating at 1500 fpm, where the heat removal condition is most critical. This progress was made possible by recent metallurgical discoveries and practices, but most of all by improved coolant system designs.

Bliss has designed several new fast mills, including the fastest mill now in operation, and modestly admits pride in having collaborated with personnel of several plants towards modernizing and speeding up several existing mills of obsolete vintage; and has witnessed already, the successful operation of these units in their daily production, exceeding anything of the past.

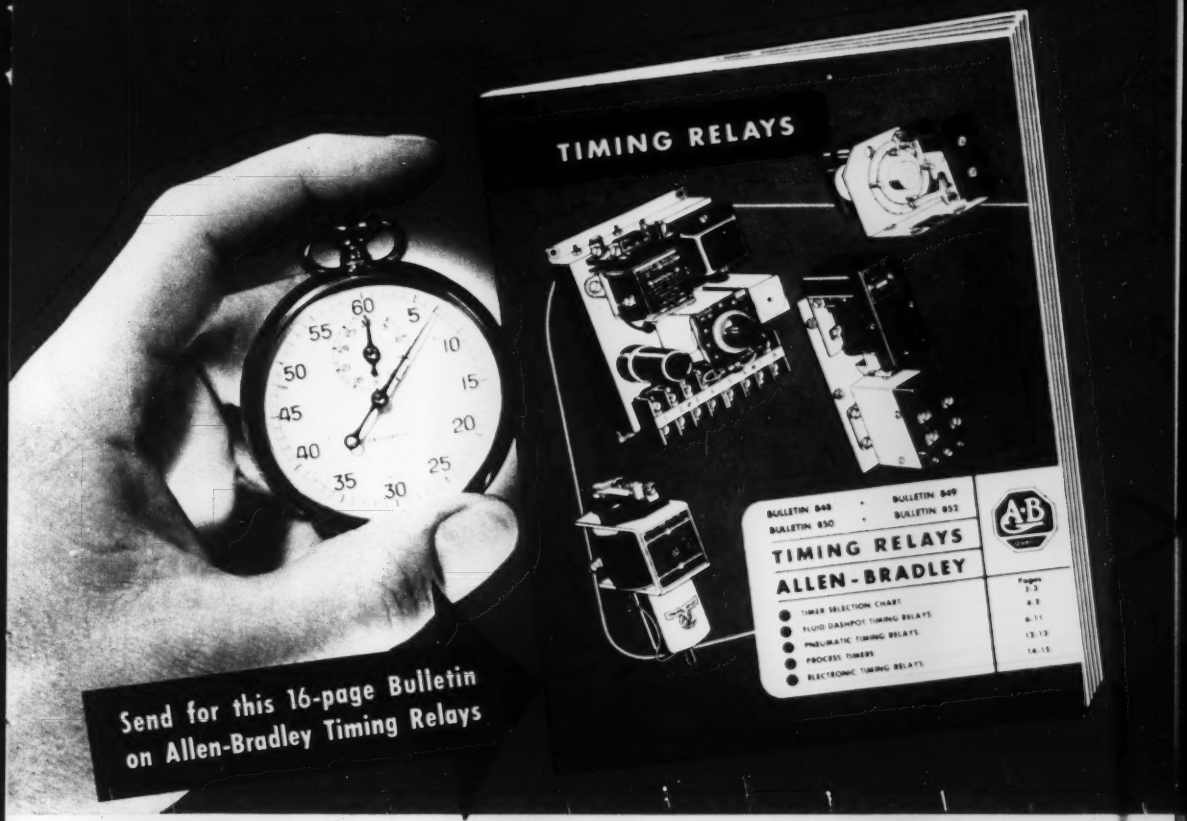
Careful Work—Where unprecedented speeds were involved, either in new designs or revitalizing programs, the developments were not spontaneous, or impetuously decided. The progress was slow, methodical, and carefully planned and evaluated with the people whom we served. Bad guesses cannot be tolerated in this business.

Speed is not the total answer or a panacea to all production ailments, but is certainly not to be overlooked in any search for the best solution. In many cases, it may have merit, or even be the only solution to sluggish production.

One final point to be emphasized is no one has yet figured out how to deny energy its full dues. At high or slow speeds, any given unit volume of metal displaced, regardless of process, takes so much horsepower to achieve, and whether done in one hour or one hundred hours, the energy consumed is the same per ton of steel processed.

A Machine to Cold Reduce 18-inch Tubing, by Graham B. Brown, administrative assistant, Tube Reducing Corp., Wallington, N. J.

Tube reducing machines were



FOUR POPULAR TIMERS • SIMPLE AND DEPENDABLE

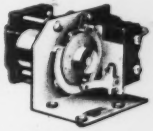
PNEUMATIC

Bulletin 849 pneumatic timing relay is a long life timer of high repetitive accuracy. Has an adjustable pneumatic bellows for regulating the tripping time. Time delay minimum—¼ second; maximum—3 minutes. The operation of this pneumatic timer is easily changed from "on delay" to "off delay." A reliable, compact timer that is available in a wide variety of contact arrangements. It can be furnished in open type or in enclosures of various constructions.

FLUID DASHPOT

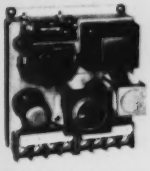
Bulletin 848 fluid dashpot timing relay is a low cost, adjustable timer for applications not requiring a high degree of accuracy, such as for timing electrically operated valves, motor starting sequences, etc. Time delay minimum—2 seconds; maximum—30 seconds. Single pole contacts, either normally open or normally closed. Silicone dashpot fluid assures consistent action at low ambient temperatures. Furnished in open type for panel mounting, or in pressed steel and cast iron enclosures for every service.

MOTOR DRIVEN



Bulletin 850 Style L motor driven timer is a precision switch of the maintained contact type. It alternately opens and closes two switch units 2, 3, 4, or 6 reversals per min. Ideal for controlling reversible machinery such as laundry washers or other processing equipment. Run and drift time easily adjusted. Silver alloy contacts.

ELECTRONIC

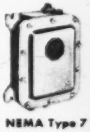


Bulletin 852 Electronic Timer has a thyratron tube used as a combination a-c rectifier and electronic switch. In 8 timing ranges from 0.025 sec. to 2 min. Accuracy 2% of setting. Ideal for machine tools, high frequency heating equipment, and photographic printing.

STANDARD ENCLOSURES FOR EVERY SERVICE

NEMA Type 1

NEMA Type 4



NEMA Type 7

ALLEN-BRADLEY

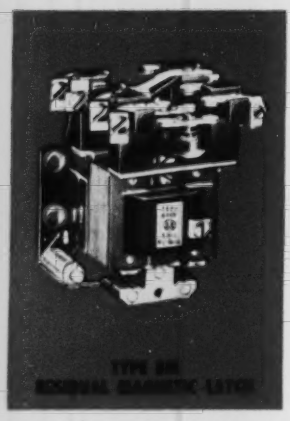
QUALITY

TIMING RELAYS

A-B Quality

6-52—MR

HUM-FREE A-C RELAYS

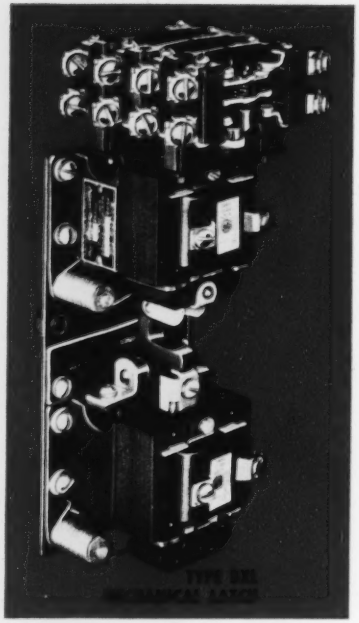


Here are two unique, hum-free relays that require no coil current to keep them closed.

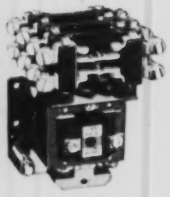
The Type BM relay is a compact unit which is closed by momentarily energizing the solenoid coil. The relay is held firmly closed by residual magnetism until opened by a momentary demagnetizing current.

The Type BXL relay is a standard Bulletin 700 magnetic relay with a mechanical latch. The secondary solenoid, beneath the relay, delatches the upper relay to open it.

Allen-Bradley Co.
1316 S. Second St., Milwaukee 4, Wis.

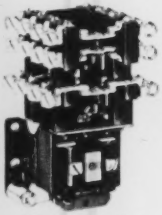


A-C and D-C TROUBLE FREE CONTACTORS and RELAYS
for Automatic and Sequence Controls



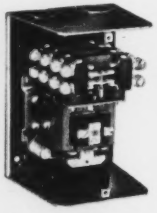
4 Pole A-C Relay

This universal type relay is equipped with four normally open contacts and four normally closed contacts, all actuated by one solenoid plunger. Great flexibility of circuit connections is offered by the double arrangement of contacts. Will handle circuits up to 600 volts a.c. Widely used in refrigeration and air conditioning. Contacts need no maintenance.



8 Pole A-C Relay

Bulletin 700 relays are listed in many contact combinations and polar arrangements. They are widely used for oil burners, stokers, unit heaters, and as control relays for electric furnaces. They are good for millions of trouble free operations. Their consistent performance makes them ideal for machine tool sequence operations. There is no contact maintenance.

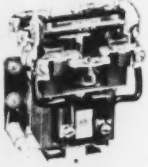


Relay in Enclosure

These relays can be furnished open or in enclosures that protect them in applications where watertight, weatherproof, or explosion-proof enclosures are needed.

Push buttons and limit switches available in a variety of enclosures.

Send for Allen-Bradley Bulletin 700 for details of relays with 1, 2, 3, 4, 5, 6, 8, and 10 poles.



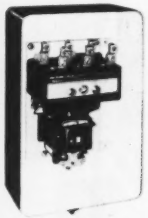
3-Wire Thermostat Relay

Low Current A-C Relay

For temperature controls with thermostats.

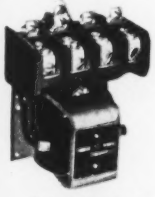
D-C Relay

2 N.C. —1 N.O. contacts.



A-C Contactor

Allen-Bradley a-c contactors are available up to 900 amperes.



D-C Contactor

Allen-Bradley direct current contactors are available in single and double pole construction up to 600 amperes.

ALLEN-BRADLEY
RELAYS & CONTACTORS

6-52—R

used to make tapered steel cores for airplane propeller blades during World War II. Subsequent development of military items has increased the demand for large diameter light wall cold finished seamless tubing. The Navy requested the design of a tube reducing machine of sufficient size to meet the estimated needs for the future.

As a result of a preliminary study, it was decided to make two machines, one to reduce 10-inch diameter tubing and the other to reduce 18-inch diameter tubing. The large machine consists primarily of a roll housing, weighing close to 150 tons, which travels back and forth horizontally for about 7 feet. This housing carries 50-inch diameter rolls with removable insert dies provided so that a complete roll change is not required for each change of pass. The insert dies weigh about 4 tons and are made of through hardening steel, heat treated to a surface hardness of Rockwell C-60.

Roll neck bearings are the double roller spherical type in a size having the largest load rating ever manufactured. The saddle and rolls are driven by a hydraulic system through a pair of 13-inch diameter cylinders requiring 5400 gpm of oil at a pressure of 2500 psi. The drive system is equipped with a servo-mechanism control and safety devices to protect it in the event of a jam. The two pumps are a special design wobble plate type, driven through speed reducers by 700-hp synchronous motors. The tube is fed intermittently into the rolls in small increments and is turned about 60 degrees between each pass of the saddle, by means of large hydraulic motors. The total weight of the machine is about 650 tons.

Application of Automatic Combustion Controls to a New Open Hearth Shop, by F. S. Swaney, combustion engineer, Pittsburgh Works, Jones & Laughlin Steel Corp.

One of the most important features of the present expansion program at the Pittsburgh Works of Jones & Laughlin Steel Corp. is the new open-hearth shop recently put into operation. The shop consists of 11 stationary furnaces of 250 net ton capacity. The design features include suspended basic ends, single pass checkers, and natural draft stack. The furnaces are fired with residual tar or fuel oil in combination with coke oven gas. Facilities for the use of oxygen in both the bath and burner have been provided.

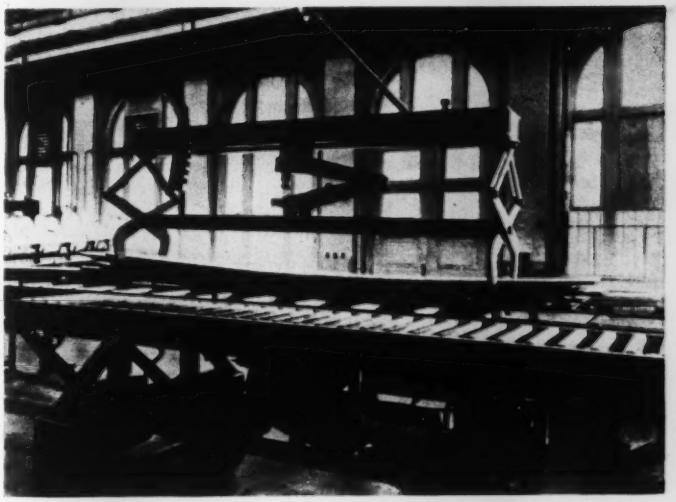
Instrumentation on each furnace includes flow metering of liquid fuel, combustion air, atomizing steam, oxygen, and coke oven gas; temperature measurement of roof, flues, stack, superheated steam, and liquid fuel. Automatic controls provided include fuel flow, fuel-air ratio, roof temperature, atomizing steam pressure, furnace pressure, and liquid fuel temperature. Each furnace is also equipped with a recorder for bath temperature measurement using a platinum thermocouple.

Furnace reversal is automatic from either time or temperature difference and is accomplished electro-pneumatically. All recorders and indicators are mounted on a panel board which is housed in a glass front pressurized control room. The operator's controls, including the pushbuttons, transfer switches, timers, manual control stations, etc., are mounted on a console which forms part of the front wall of the control room. All measurements involved in the control system are converted to electrical or pneumatic impulses at the primary element location. Since all controls are pneumatic also, only electric and air transmission lines are carried into the control room.

This new design was adopted in order to improve housekeeping as well as to eliminate the safety hazard attendant to the running of fuel lines in confined areas. Miscellaneous control instrumentation includes gas flow metering and gas pressure regulation stations, liquid fuel circulating line metering and sectionalized temperature control, and pilot viscosity measurement of fuel oil and tar.

A New High Temperature Alloy, by M. N. Ornitz, works manager, and R. H. English, chief metallurgist, of National Alloy Steel Division, Blaw-Knox Co., Blawnox, Pa.

Limitations imposed upon many metallurgical processes due to the strength and corrosion resistance of the heretofore available commercial heat resistant alloys has long been apparent. Recognizing



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this fact, we have developed a heat resistant alloy which has properties which permit practical engineering applications at temperatures up to 2200° F. This permits an increase of 200° F over previous practical design for alloys, and the importance of this from an industrial point of view is shown. The use of this new alloy, which we have designated as NA22H, allows higher load carrying capacity at these elevated temperatures of 2000° F and above. In addition it has greater resistance to oxidation under the normal temperature fluctuations encountered in furnace operations at these temperatures. Because of these properties of strength and oxidation resistance at 2000° F and above, NA22H has enabled those who have used it to increase productivity, to use less alloy and to design equipment which would not otherwise have been possible.

Data is presented in this paper covering the properties of NA22H in stress to rupture, creep and corrosion resistance in hot gases. These data are compared with those of the standard commercial heat resisting alloys 35 Ni-15 Cr (HT), 25 Cr-12 Ni (HH) and 25 Cr-20 Ni (HK) which are now used for temperatures not exceeding 2000° F.

This newly developed material has been thoroughly tested in many types of industrial applications and has proved itself to be of positive economical advantage and is resulting in an increased demand. A review of case histories of some applications is made showing benefits that have been and can be achieved by use of this alloy, as well as discussion of its limitations and future possibilities.

A Simplified Automatic Ingot Buggy, by I. N. Tull, electric superintendent of Republic Steel Corp., Cleveland, O.

Ingot buggy described is cable driven from a drum centrally located in a basement under the buggy track. The buggy receives the ingot from nine fixed locations and delivers the ingot to a receiving table at the end of the track. The ingot cradle engages a cam at the end of the receiving table and in the last few feet of travel, tips the cradle forward and deposits the in-

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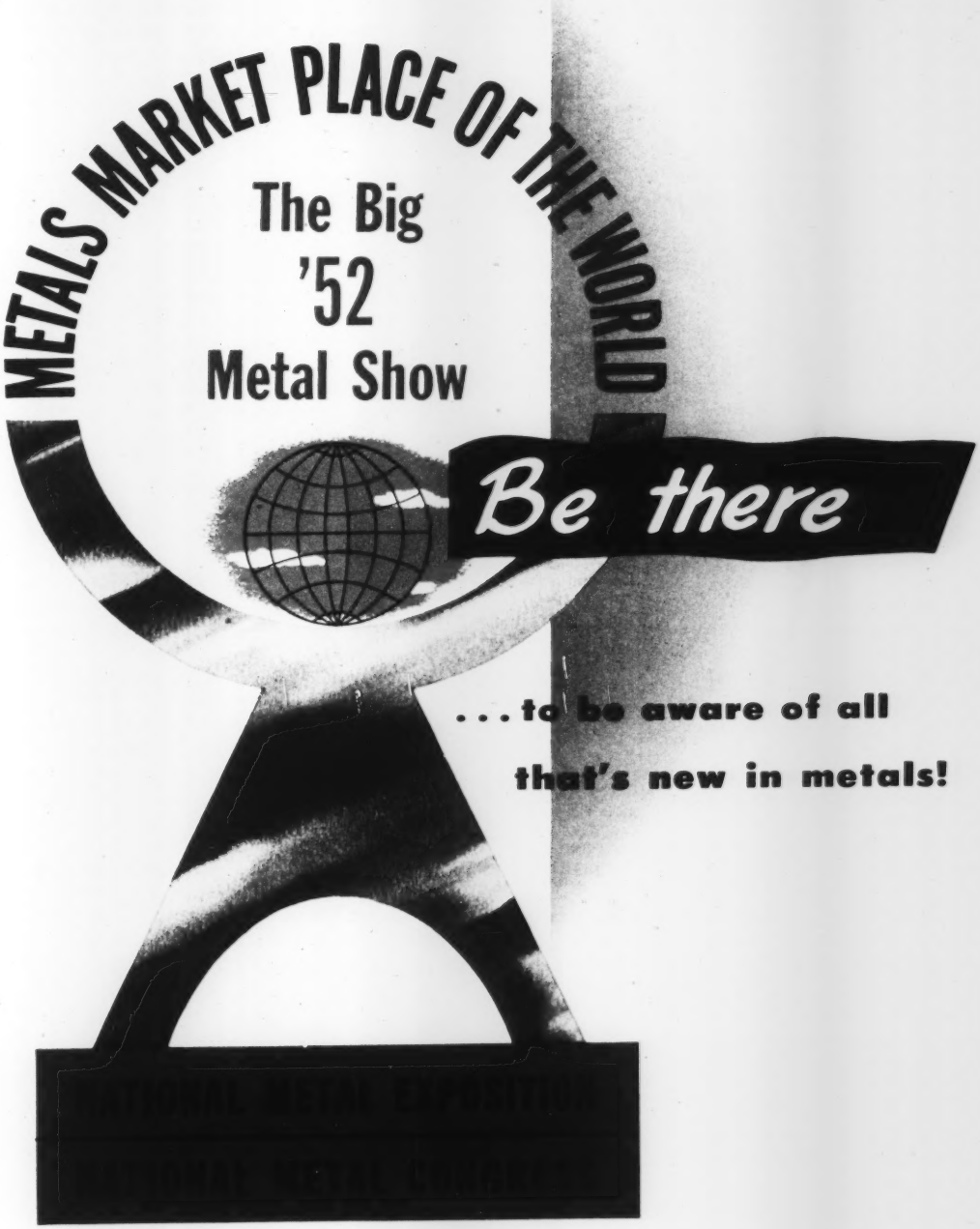
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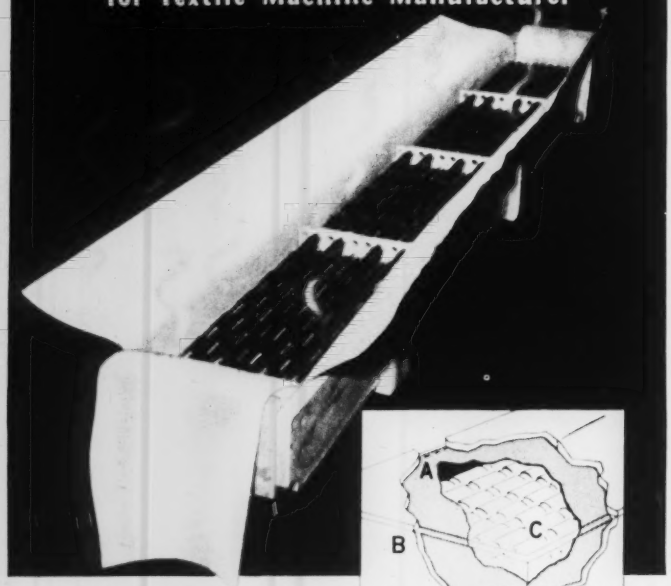
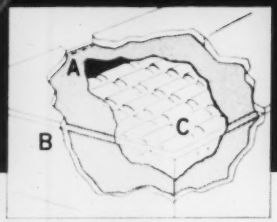
Vapor-from-Paper STOPS RUST

for Textile Machine Manufacturer





HOW IT WORKS! Used here as a box liner, Angier VPI Wrap (A) gives off a vapor. This magic-like vapor permeates the area within box (B) to prevent rust of machine parts (C). *Saco-Lowell Photo*

Here, messy grease and oil coatings have had their day. Now, in only the time it takes to line a box, textile machine parts are ready to ship or store with no chance of rusting.

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got on the table rolls. The track and receiving table are in line so that the buggy stalls against the end of the table for discharge of the ingot. The 30,000-pound buggy travels at a maximum speed of 1200 fpm.

A single 200-hp motor supplied from a 150-kw variable voltage generator, drives the cable drum. All movements of the buggy are controlled by the operator located near the receiving table. Nine pushbuttons corresponding to the nine positions give him complete control. The selection established by pushbuttons may be changed at any time. A conveniently located meter indicates the position of the buggy at all times.

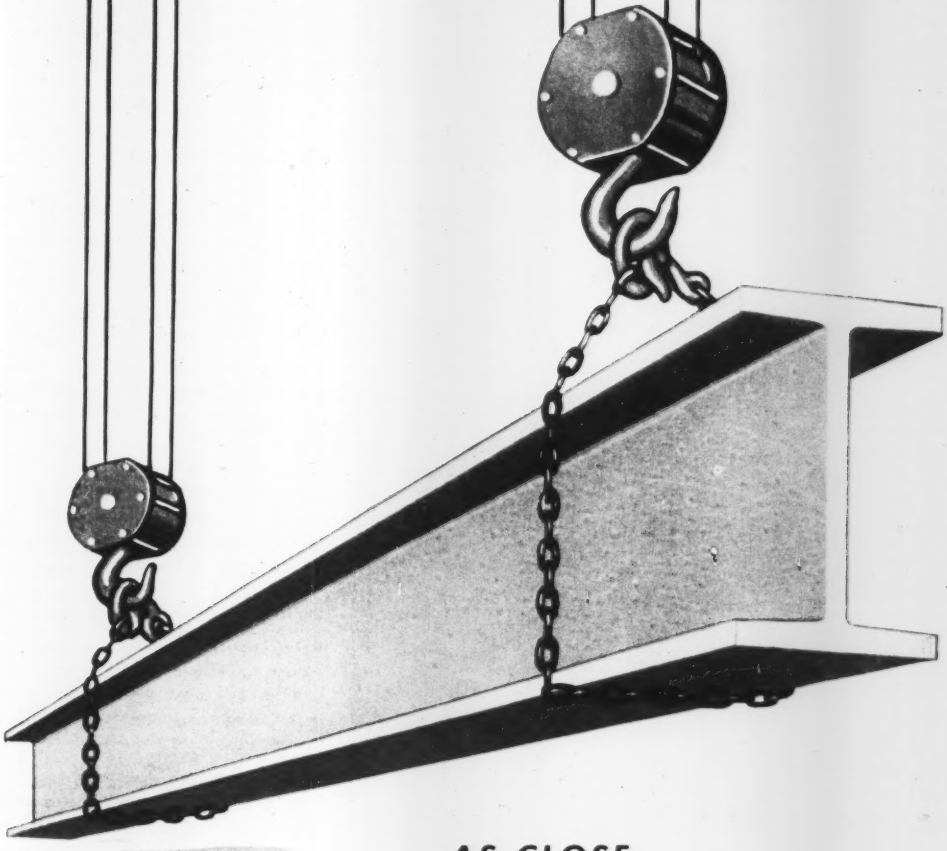
A simple and reliable control scheme provides complete intelligence for governing the speed of the buggy, such as traversing any given distance in the shortest possible time without overshooting and stopping accurately at the desired position. This control scheme makes use of a rheostat driven by the cable drum. The rheostat is connected in a bridge circuit. Sensitive polarized relays detect the direction and amount of bridge unbalance and cause the generator voltage to build up in the required direction to move the buggy and thus, restore the bridge circuit balance. The buggy will be located at the desired position when the bridge circuit becomes balanced.

Material Handling Layout of Blast Furnace and Coke Plant at Fairless Works, by Carleton Lord, materials handling engineer, United States Steel Co., Pittsburgh.

Studies in recent years reveal a large per cent of all the direct labor man-hours involved in making steel are related, either directly or indirectly, to some form of materials handling. It was natural, therefore, that plans for the new Fairless Works should attach prime importance to the provision of proper handling facilities.

Discussed are the methods and equipment which have been planned to handle raw materials at the coke plant and the blast furnaces. These facilities include a boat slip, two boat unloaders, a car dumper, ore screening station, ore storage yard and trough, one ore bridge, two transfer cars on the blast fur-

STRUCTURALS . . .



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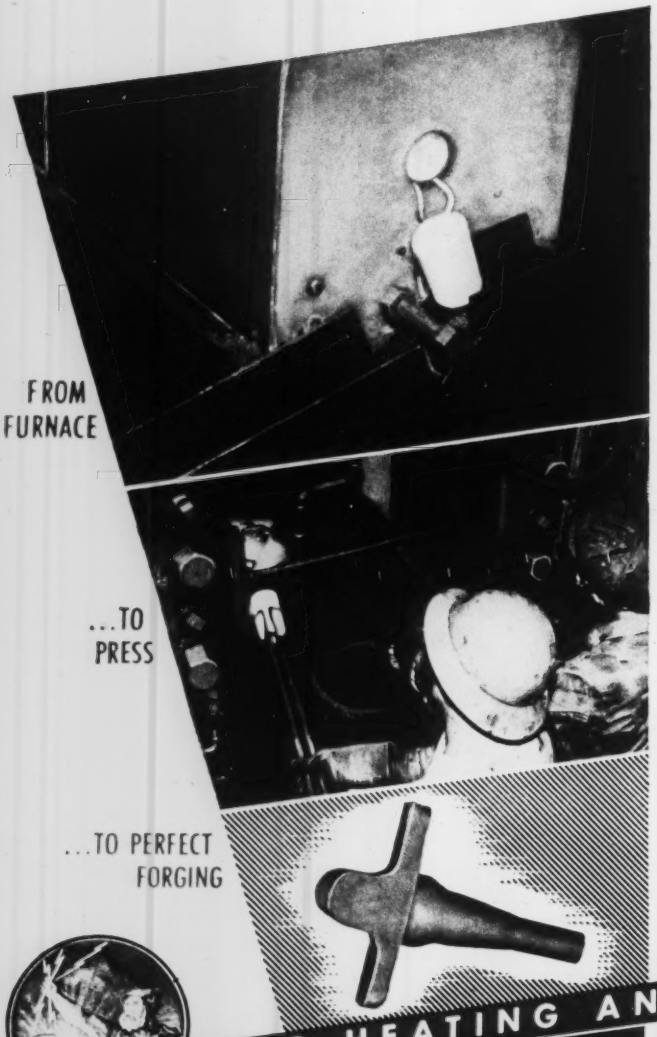

Improved forging methods, using Ajax-Northrup induction heat, have reduced billet weights for these axle spindle forgings from 7½ to 5¼ pounds. Resultant steel savings add up to *ten tons* of SAE 5132 bar stock a day!

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nace trestle, coal storage yard, coal mixing bins, coke screening station, and a system of interconnecting conveyors.

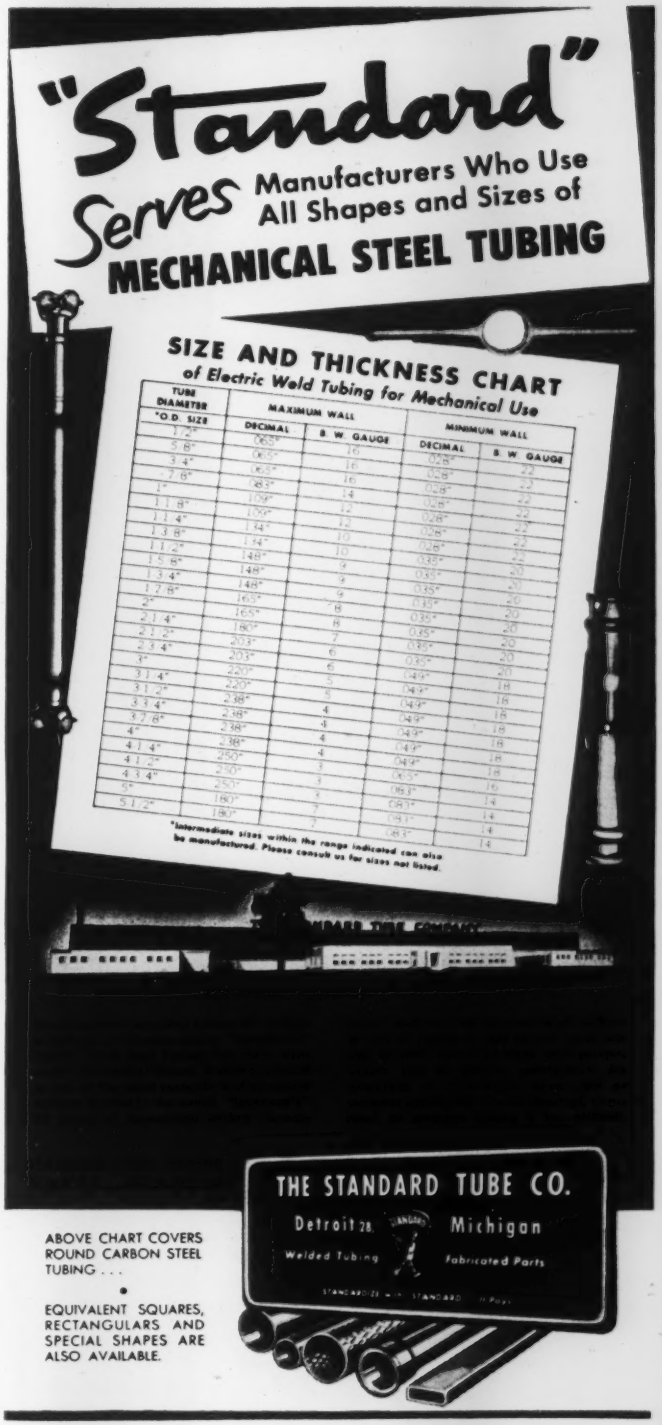
Design of the handling system required close attention to present as well as future requirements for material movement. For example, although the Fairless Works will commence operations as a completely integrated steel mill with two by-product coke batteries and two blast furnaces, the basic layout has been planned to permit orderly expansion of production facilities. Thus, handling facilities had to be designed to provide increased capacity by conversion or addition as required.

Also, it was necessary to provide for future changes in sources of raw materials which will alter the manner of delivery. For instance, the bulk of the initial ore receipts will come by rail from the Mesabi range; ultimately domestic ores will largely be replaced by Venezuelan ores, which probably will be shipped directly to the mill by water. Thus, the raw materials handling system has been designed to provide complete flexibility consistent with sound economic engineering and to preclude future costly change-overs.

Experiences with Oxygen Control in Open Hearth Flue Gases, by F. P. Hubbell, fuel department superintendent at the Homestead, Pa., works of United States Steel Co.

Possible advantages from controlled excess air in open hearth flue gases, as related to furnace production rates, combustion efficiency, and maintenance requirements are briefly outlined. Selection of sampling points and methods of flue gas analysis for excess air determination in furnace flue gases are discussed.

A description is given of an installation for continuous sampling and control of oxygen content in flue gases on a 225-ton basic open-hearth furnace. Details of the performance and maintenance requirements of the various units used in the sampling and control system are described. No definite conclusions covering furnace performance while on oxygen control are reached. Future design changes to eliminate major difficulties experienced with present installation are also discussed.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October 6-7, Rail Steel Bar Association: Fall meeting, Hotel Cleveland, Cleveland. Association address: 38 S. Dearborn St., Chicago. Secretary: W. H. Jacobs.

October 6-10, National Hardware Show: Grand Central Palace, Atlantic City, N. J. Managing director: Frank Yeager.

October 9, American Iron & Steel Institute: Regional technical meeting, William Penn Hotel, Pittsburgh. Institute address: 350 Fifth Ave., New York 1. Meeting director: Frank Ragland.

October 10, National Noise Abatement Symposium: Armour Research Foundation, Illinois Institute of Technology, sponsor, Technology Center, Chicago.

October 11-14, National Association of Waste Material Dealers Inc.: Fall meeting, Los Angeles. Association address: 271 Madison Ave., New York. Secretary: Clinton M. White.

October 13-17, American Institute of Electrical Engineers: Fall general meeting, New Orleans, La. Institute address: 33 W. 39th St., New York 18. Secretary: H. H. Henline.

October 14-16, Society of Industrial Packaging & Materials Handling Engineers: Annual meeting and short course, Chicago Coliseum, Chicago.

October 16-17, Gray Iron Founders' Society Inc.: Annual meeting, Hotel Cleveland, Cleveland. Society address: 210 National City-E. 6th St. Bldg., Cleveland. Secretary: Donald H. Workman.

October 16-18, Foundry Equipment Manufacturers Association: Annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Association address: Engineers Bldg., Cleveland 14. Secretary: Arthur J. Tuscany.

October 17, American Supply & Machinery Manufacturers Association and National Industrial Distributors Association: Joint regional meeting, Benjamin Franklin Hotel, Philadelphia. ASMMA address: 814 Clark Bldg., Pittsburgh. General manager: R. Kennedy Hanson.

October 17-19, Metal Treating Institute: Annual meeting, Hotel Warwick, Philadelphia. Institute address: 271 North Ave., New Rochelle, N. Y.

October 18-19, American Society for Metals: Annual seminar, Benjamin Franklin Hotel, Philadelphia. Society address: 7301 Euclid Ave., Cleveland 3. Secretary: W. H. Eisenman.

October 19-21, Conveyor Equipment Manufacturers Association: Annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Association address: No. 1 Thomas Circle, Washington 5. Executive vice president: R. C. Sollenberger.

October 19-22, American Institute of Wholesale Plumbing & Heating Associations Inc.: National convention, Chalfonte-Haddon Hall, Atlantic City, N. J. Institute address: 402 Albee Bldg., Washington, D. C. Executive secretary: George T. Underwood.

October 20-22, Packaging Institute: Annual meeting, Hotel Commodore, New York. Institute address: 342 Madison Ave., New York 17. Secretary: L. V. Burton.

October 20-24, American Society for Metals: Annual meeting, Benjamin Franklin Hotel, Philadelphia. Society address: 7301 Euclid Ave., Cleveland 3. Secretary: W. H. Eisenman.

October 20-24, American Welding Society: Annual meeting, Bellevue Stratford Hotel, Philadelphia. Society address: 33 W. 39th St., New York 18. Secretary: J. G. Magrath.

October 20-24, Society for Non-Destructive Testing Inc.: Annual meeting, Hotel Sylvania, Philadelphia. Society address: Box 710, Evanston, Ill. Secretary: Philip B. Johnson.

October 20-24, American Institute of Mining & Metallurgical Engineers: Fall technical session, Hotel Adelphia, Philadelphia. Institute address: 29 W. 39th St., New York 18. Secretary: Edward H. Robie.

October 20-24, National Metal Congress & Exposition: Convention Hall, Philadelphia. Sec-

(Continued on p. 118)

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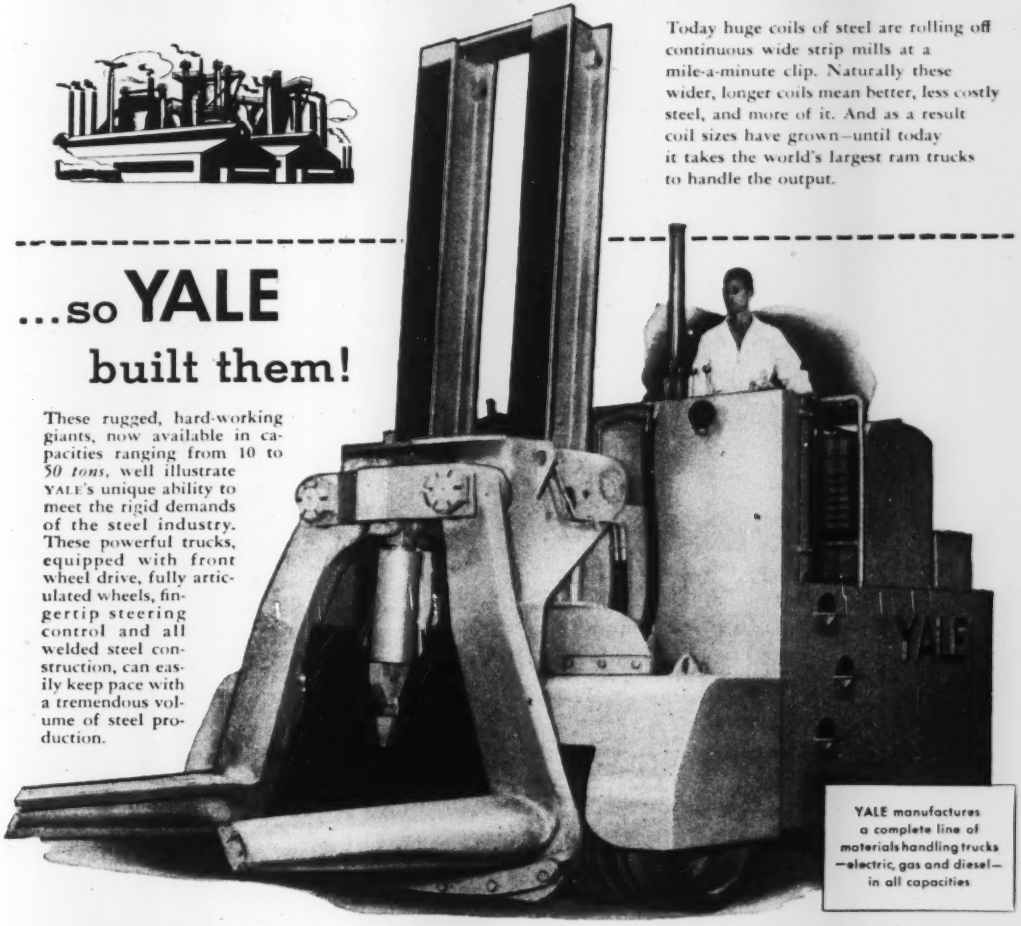

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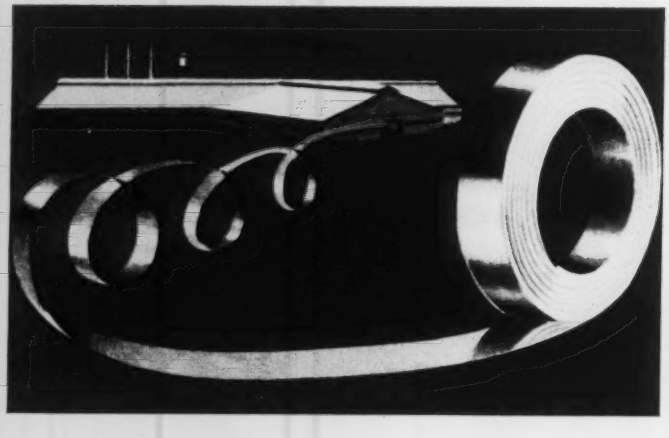

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(Continued from p. 116)

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October 20-24, National Safety Council: National safety congress & exposition, Conrad Hilton Hotel, Chicago. Council address: 425 N. Michigan Ave., Chicago 11.

October 22-24, Porcelain Enamel Institute: Annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Institute address: DuPont Circle Bldg., Washington 6. Secretary: John C. Oliver.

October 22-24, Society of Automotive Engineers: National transportation meeting, William Penn Hotel, Pittsburgh. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

October 27-29, National Lubricating Grease Institute: Annual meeting, Edgewater Beach Hotel, Chicago. Institute address: 4638 J. C. Nichols Parkway, Kansas City 2, Mo. Executive secretary: Harry F. Bennetts.

October 27-29, American Gear Manufacturers Association: Fall meeting, Edgewater Beach Hotel, Chicago. Association address: 302 Empire Bldg., Pittsburgh 22. Executive secretary: John C. Sears.

October 27-30, American Gas Association: Annual meeting and exposition, Municipal Auditorium, Atlantic City, N. J. Association address: 420 Lexington Ave., New York 17. Secretary & convention manager: Kurwin R. Boyes.

October 27-31, Electrochemical Society Inc.: Fall meeting, Mt. Royal Hotel, Montreal. Society address: 235 W. 102nd St., New York 25. Secretary: Dr. Henry B. Linford.

October 28-29, Materials Handling Conference: Westinghouse Electric Corp., sponsor, Hotel Statler, Buffalo.

October 30-31, National Association of Aluminum Distributors: Annual convention, Del Monte Lodge, Pebble Beach, Calif.

October 30-November 2, National Tool & Die Manufacturers Association: Annual meeting, Hotel Sheraton, Rochester, N. Y. Association address: 906 Public Square Bldg., Cleveland. Executive secretary: George S. Eaton.

November 3-4, Society of Automotive Engineers: National diesel meeting, Hotel Chase, St. Louis. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

November 5-7, Industrial Management Society: Annual time and motion study, and management clinic, Hotel Sheraton, Chicago. Society address: 35 E. Wacker Drive, Chicago 1.

November 5-9, Scientific Apparatus Makers Association: Mid-year meeting, industrial instrument, laboratory equipment, optical, aeronautical and military instrument sections. The Homestead, Hot Springs, Va. Association address: 20 N. Wacker Drive, Chicago 6. Secretary: Kenneth Anderson.

November 6-7, Society of Automotive Engineers: National fuels and lubricants meeting, The Mayo, Tulsa, Okla. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

November 8, American Society of Tool Engineers, Chicago Chapter: Annual midwestern tool engineering conference, Urbana, Ill. Conference arrangements: Prof. L. E. Doyle, University of Illinois.

November 8-9, Open Steel Flooring Institute Inc.: Fall meeting, The Greenbrier, White Sulphur Springs, W. Va. Institute address: 2311 First National Bank Bldg., Pittsburgh 22. Secretary: Stuart J. Swennson.

November 9-11, Grinding Wheel Institute: Annual meeting, Hotel Claridge, Atlantic City. Institute address: 2130 Keith Bldg., Cleveland 15. Manager: F. A. Peterson.

November 9-11, Abrasive Grain Association: Annual meeting, Hotel Claridge, Atlantic City. Institute address: 2130 Keith Bldg., Cleveland 15. Manager: F. A. Peterson.

November 10-11, The Magnesium Association: Annual meeting and exhibit, Hotel Biltmore, New York. Association address: 122 E. 42nd St., New York 17. Assistant secretary: (Miss) Martha I. Hansen.

November 10-13, The Wire Association: Annual meeting, Hotel Carter, Cleveland. Association address: 453 Main St., Stamford, Conn. Executive secretary: Richard E. Brown.

November 10-14, National Electrical Manufacturers Association: Annual meeting, Haddon Hall, Atlantic City, N. J. Association address: 155 E. 44th St., New York 17. Secretary: W. J. Donald.

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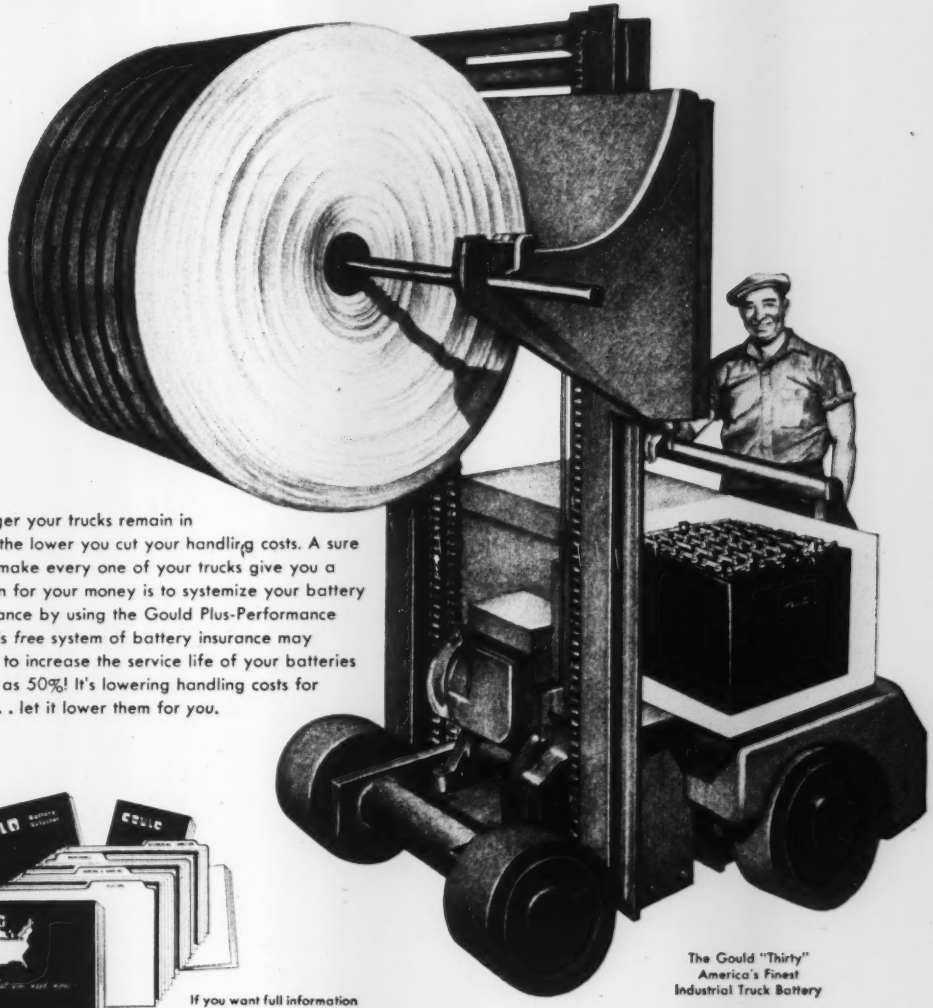

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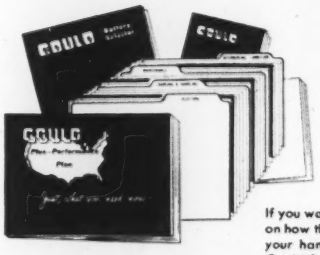

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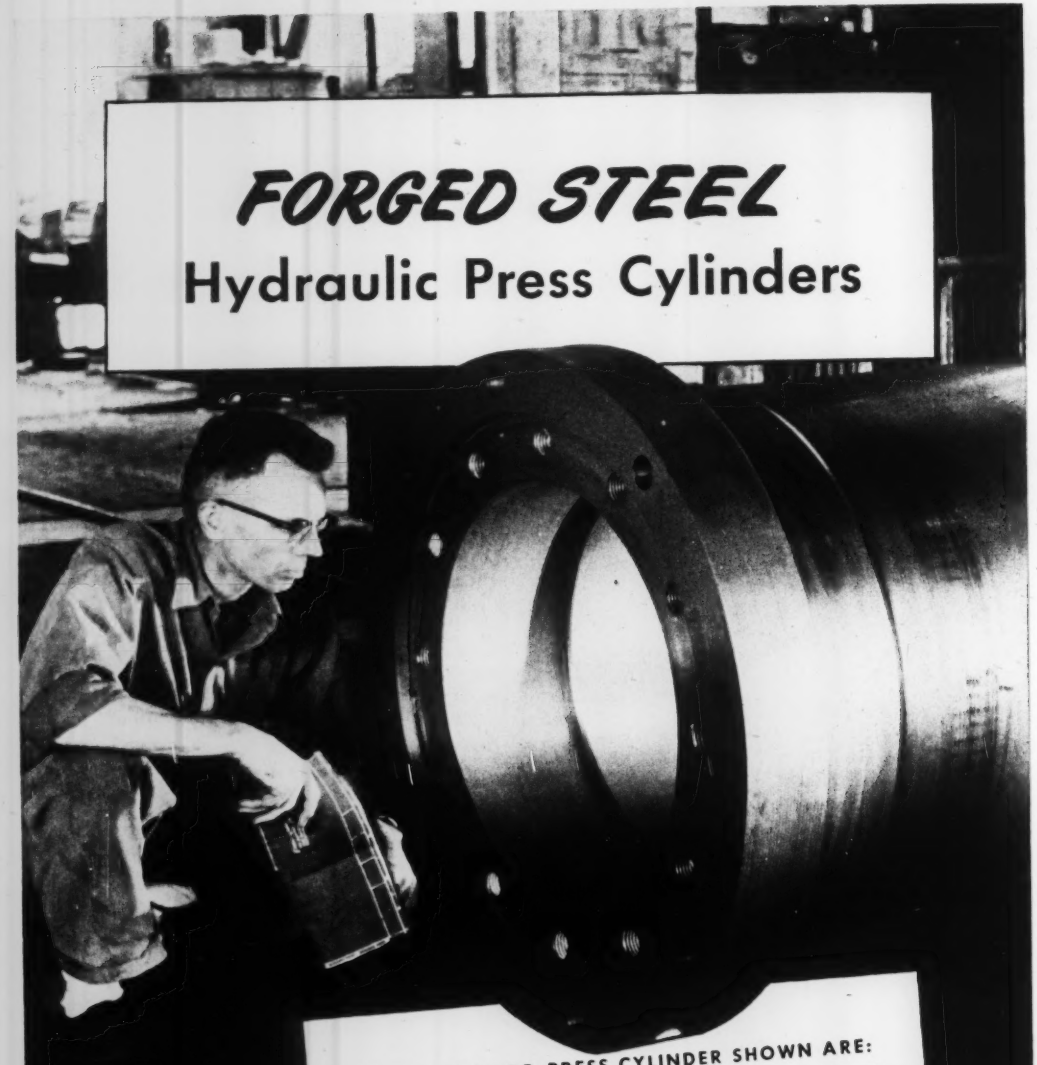

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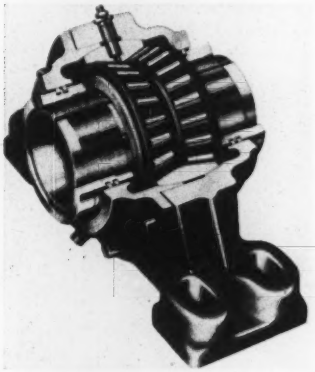
USE REPLY CARD—CIRCLE No. 1

A new line of all-steel pillow blocks, providing high load-carrying capacity in a compact and rugged package, is offered by Dodge Mfg. Corp., Mishawaka, Ind. The bearings are a joint development of Dodge and Timken Roller Bearing Co., Canton, O. High radial and thrust capacities and



. . . high capacity, minimum weight

stamina to take heavy-shock loads are provided within minimum dimensions and with less than usual weight.

The bearings are fully self-aligning, with spherical outer race. They are available in expansion and non-expansion types and have adapter mounting. Double piston ring seals keep lubricant in and dirt and dust out of the bearing mechanism. Bearings are sealed both on and off the shaft. They are available in shaft sizes from 2 15/16 to 10 inches.

Sand Blaster Refills Easily

USE REPLY CARD—CIRCLE No. 2

Dished top and a simple, air operated filling valve that eliminates binding and obstruction sometimes encountered simplify refilling in a sand blaster offered by Vacu-Blast Co. Inc., 350 Peninsular Ave., San Mateo, Calif. In this unit, one three-way valve replaces the two separate inlet valves generally required for the tank and blast lines. Tungsten carbide nozzles are standard equipment and welded tank is pressure tested to twice the normal operating pressure of 125 psi.

Three models are offered, having sand capacities of 125, 600 and 1000 pounds. They use 1.7, 15 and 28 pounds of sand per minute respectively. Axles and rubber tired wheels can be furnished as optional equipment.

Hand-Operated Slip Roll

USE REPLY CARD—CIRCLE No. 3

Hand-operated slip roll, said to form complete circles in 16-gage steel in one-third less time than the job ordinarily requires is offered by O'Neil-Irwin Mfg. Co., Lake City, Minn. The roll also forms bends at any point in a

. . . forms complete circles in two passes

sheet of material. One feature is a cam-actuated idler roll that permits complete circles 1-inch diameter or larger to be formed in two passes through the rolls.

In this circle-forming work, the cam-operating lever lowers the idler roll to allow insertion of material. It also raises the roll to a preset position that determines the diameter of the circle to be formed. The half-circle is formed on the first pass through the roller; on the second pass the circle is completed. Because idler roll always returns to its preset position, parts can be duplicated accurately and at a high production rate.

Maximum material forming capacity is $\frac{1}{4}$-inch round steel bar and $\frac{1}{4}$-inch tubing. Called the Di-Acro roller, machine is available in two sizes. One forms material up to 6 inches wide; the second handles a maximum 12-inch width.

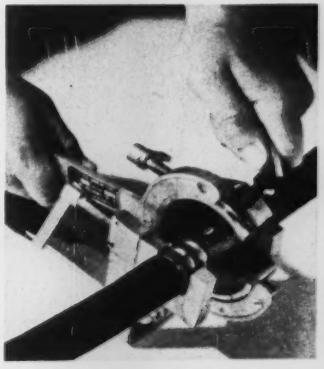
REPLY CARDS

on page 135 will bring you more information on any new products and equipment in this section.

Portable Crimping Tool

USE REPLY CARD—CIRCLE No. 4

Mechanical portable hand crimping tool that makes a full circumferential crimp into connectors and lugs is offered by F. M. Anthony Co., 2022 Oakland Ave., Piedmont 11, Calif. Working on a



. . . crimps sizes from No. 4 to 500 mcm

ratchet principle, the Insul-Lock tool crimps a range of wire and cable sizes from No. 4 through 500 million circular mills without die change or application of heat. The tool's light weight—2¾ pounds—indicates one advantage; operating simplicity, low cost and minimum maintenance are others.

Massive Knife Grinder

USE REPLY CARD—CIRCLE No. 5

Introduction of a 12-ton grinder built with hydraulic fluid motor

drive in its 220 series is announced by Samuel C. Rogers & Co., 183-205 Dutton Ave., Buffalo 11, N. Y. Built for maintenance or production work, the tool is particularly adaptable for fast grinding of shear blades, veneer, chipper or other heavy-duty knives. It can be used also for flat face, bevel and edge grinding. The model's work table measures 184 inches. A magnetic chuck speeds work loading and unloading time.

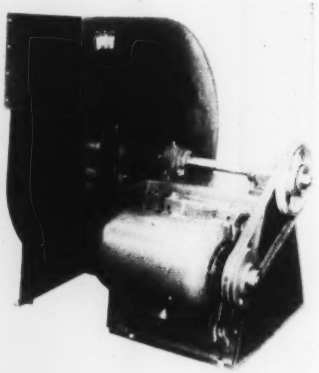
Even though the work table weighs as much as 4 tons, fluid drive moves the work past the grinding head at speeds up to 100 fpm. This speed is gained within 1 foot, starting from a dead stop. Grinding wheel is of the segmental type, driven by a 25-hp, heavy-duty, ball bearing motor. Machine is said to grind an 0.0015-inch tolerance.

Three-Purpose Industrial Fan

USE REPLY CARD—CIRCLE No. 6

An industrial fan built with air handling, materials handling or long shavings wheels is available from Westinghouse Electric Corp., Pittsburgh 30, Pa. The fan is made in 11 sizes with capacities ranging from 670 to 44,000 cfm and pressures to 16 inches water gage.

Air handling wheel has backward incline blades featuring low power consumption over a wide range of volumes and pressures. This unit is particularly suitable for exhausting smoke, fumes and light dusts. The straight-bladed, side plated materials handling wheel combines high fan efficiency with its handling features. Conveying sawdust, granular materials and chips are typical applications. The long shavings wheel has no side plates and is designed specifically for handling long, stringy fibers. Standard accessories for the fan include bolted and quick-opening-type access doors, flanged outlets and inlets, and outlet dampers. It can be built of special metals to meet explosion-proof or anticorrosive specifications.



. . . handles air, materials, long shavings

Spray Gun Model Improved

USE REPLY CARD—CIRCLE No. 7

Cooper Alloy Foundry Co., Hillside, N. J., announces an improved model of its compact spray gun, designed for spraying low melting alloys and metals. The gun, called Spray King, should permit application to a wider range of materials than was achieved with the original model. In addition to its internal

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3000-ton hydraulic forging and cogging press.

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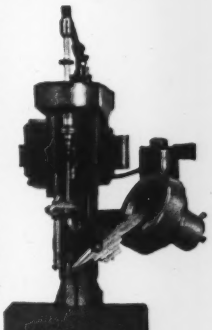
Established 1803

*Find out why. Send for your free copy of our new photographic book of plant facilities.

What's Wrong With This Picture?

THAT'S EASY There's NO DETROIT POWER SCREWDRIVER!



● Now—more than ever—speed in production is the order of the day—and D. P. S. Power Screwdrivers provide a wonderful contribution to present-day industrial needs . . . They are a "must" wherever the program calls for production assembling . . . They afford a tremendous gain over obsolete, slow hand methods. Detroit Power Screwdrivers will drive screws—any kind of screws—as fast as one a second.

● Get our Catalog NOW, describing POWER SCREWDRIVERS, MOTORIZED HOPPER UNITS, NUT DRIVERS and SPECIAL ASSEMBLING MACHINES. Write today. Also send sample assembly for production estimate.

DETROIT POWER SCREWDRIVER CO.

2811 W. FORT ST. DETROIT 16, MICHIGAN

To identify... specify Metal-Cal*

...The permanent, self-adhesive identification device

NO DRILLING, SCREWS OR RIVETS

A METAL-CAL is a .003" thickness of aluminum foil—anodized, dyed and backed with a high tensile bonding material. Easily applied to any smooth, cohesive surface. Slashes labor and material costs of conventional nameplates.

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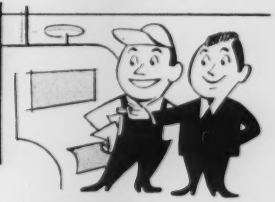
Letters, colors and characters on a METAL-CAL live as long as the metal itself . . . survive the most trying conditions of weather and wear. The best of decals and litho-plates can't match the performance of a METAL-CAL.

TREND IS TO Metal-Cals!



Industrial use of METAL-CALS for permanent, distinctive identification spreads wider every day. Names of dozens of "big-name" manufacturers who now use METAL-CALS are available on request.

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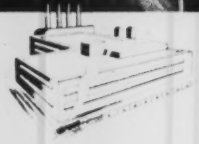
How
AMERICA
out-produces
the world
Logan Roller Conveyor provides a constant supply of airplane engine cylinder barrels for this battery of internal grinding machines.

5



American industry — keeps expensive equipment operating at capacity

Another good American industrial habit — stepping-up the hourly output of machines! This means greater production, and lower-costs too.

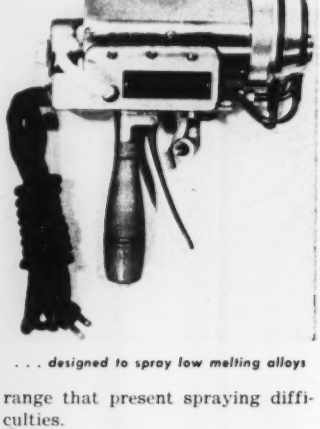
One of the chief factors in "keeping machines busy" is equipment like Logan Conveyors. By delivering a stream of material and parts to machine operators, and dispatching the product to the next operation, Logan equipment aids in attaining the high American output per machine-hour.

And remember, the name "Logan" on the installation you buy is your assurance of something extra in engineering, design, and layout. Write today to —

Logan Conveyors

LOGAN CO., 535 CABEL ST., LOUISVILLE, KY.

heating element, the gun has a specially-designed nozzle heating element that prevents metal cooling at the nozzle and assures continuous uniform spray. This indicates specific application to marginal alloys in the 500 to 650° F



. . . designed to spray low melting alloys

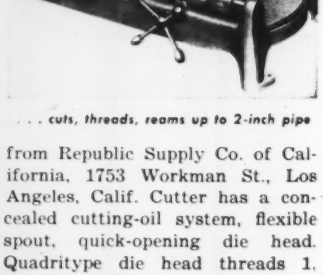
range that present spraying difficulties.

The unit is suitable for intermittent or production spraying. Its use is recommended for pattern-makers, precision casting companies, tool and die operations and maintenance. Capacity is 7 pounds of low-melting alloy.

Pipe, Bolt Threading Machine

USE REPLY CARD—CIRCLE No. 8

Machine that cuts, threads and reams pipe and bolts is a product of Ridge Tool Co. Elyria, O., and is available on the West Coast



. . . cuts, threads, reams up to 2-inch pipe

from Republic Supply Co. of California, 1753 Workman St., Los Angeles, Calif. Cutter has a concealed cutting-oil system, flexible spout, quick-opening die head. Quadritype die head threads 1, 1¼, 1½ and 2-inch pipe with one set of dies. The full floating wheel

How to slow down the fastest aircraft engine ever made!

Though the jet engine's record breaking speed is an asset in a fighter plane, it's a handicap in driving many vital accessories of a plane.

Hydraulic pumps, generators, radar equipment can't be driven directly from a shaft that turns 16,000-38,000 rpm. To reduce the shaft speed to 2,000 rpm without cutting the engine speed, proved a tricky problem.

Barium's Jacobs Aircraft Engine Co., Pottstown, Pa., solved it by grinding special gear transmissions to precision tolerances on Swiss gear grinders.

Jacobs gear specialists can do as well for you. Other members of Barium Steel Corporation can supply your other steel needs. This group of strategically located companies controls quality from blast furnace to end product, works as a self-contained unit to speed urgently needed orders.

Address inquiries to Barium, 25 Broad Street, New York City.

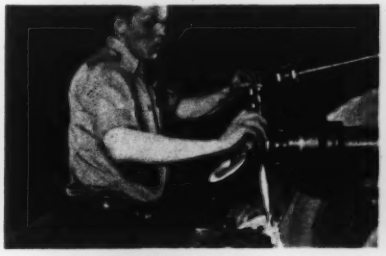
Barium

A coordinated effort of 15 companies working in steel

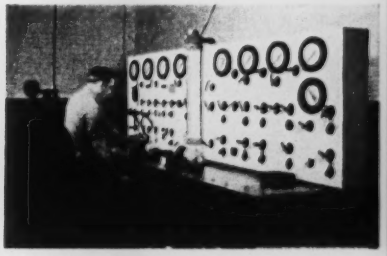
MILL PRODUCTS • SHAPES TO ORDER • END PRODUCTS

BAYONNE BOLT CORP. • CENTRAL IRON AND STEEL COMPANY • CHESTER BLAST FURNACE • CLYDE IRON WORKS, INC. • CUYAHOGA SPRING COMPANY • EDIE BOLT AND NUT COMPANY • GEOMETRIC STAMPING CO. • GLOBE FORGE, INCORPORATED • INDUSTRIAL FORGE & STEEL, INC. • JACOBS AIRCRAFT ENGINE CO. • KERNATH MANUFACTURING CO. • KERNATH LIMITED (CANADA) • PHOENIX BRIDGE CO. • PHOENIX IRON & STEEL CO. • WILEY MANUFACTURING CO.

This inspector tests Jacobs gears for accuracy in a controlled temperature area. Tolerances to .0001 in. are needed to meet high load requirements on many parts such as those for aircraft gears.



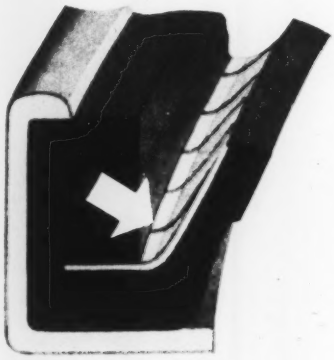
This worker's skilled handling of the latest grinding equipment helps maintain Barium's Jacobs Aircraft Engine Co.'s leadership in spur and helical gears, from tiny sizes up to 12 in. diameter.



This board tests hydraulic parts with rapid precision. In addition to auxiliary drives and other jet components, Jacobs makes complete reciprocating aircraft engines and auxiliary power plants.

GARLOCK Klozure* Oil Seals

with FINGER SPRINGS or GARTER SPRINGS FOR EVERY BEARING APPLICATION

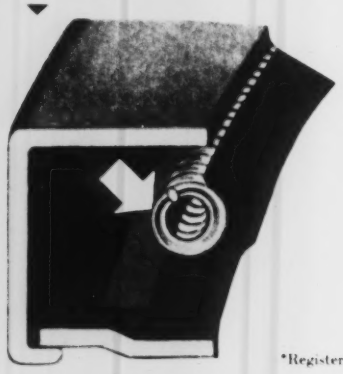


***Right:* FINGER SPRING**

The finger spring, perfected by Garlock, is very flexible. Each finger delivers independently a light yet active pressure to the lip of the sealing member. The result is a constant and responsive shaft-contact around the entire periphery of the sealing lip.

***Below:* GARTER SPRING**

The conventional type spring used in many types of oil seals. This spring is available in several KLOZURE models in which are also incorporated the same accurately molded synthetic rubber sealing member and precision-formed metal case that are used in all Garlock KLOZURE models.



*Registered Trademark

USE GARLOCK KLOZURES

There's a service-tested KLOZURE model with your choice of spring for every bearing application. These superior oil seals are produced in a wide range of sizes including Metric to fit standard International millimeter ball and roller bearing housings. Prolong the life of your bearings—*protect* them with Garlock KLOZURE Oil Seals.

Write today for Klozure Catalog No. 10.

THE GARLOCK PACKING COMPANY
PALMYRA, NEW YORK
In Canada: The Garlock Packing Company of Canada Ltd., Toronto, Ont.

GARLOCK

PACKINGS, GASKETS, OIL SEALS, MECHANICAL SEALS, RUBBER EXPANSION JOINTS

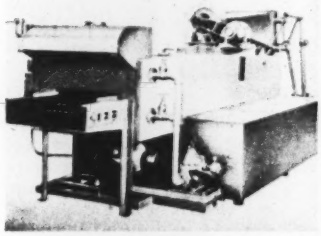
type cutoff swings clear when not in use and adjusts vertically and horizontally to any cutting position.

Full-floating reamer reams burr from $\frac{1}{8}$ to 2-inch pipe. Machine is applicable for power cutting, threading and reaming with a capacity for $\frac{1}{8}$ to 2-inch pipe, $\frac{1}{4}$ to 2-inch bolts and for cutting $2\frac{1}{2}$ to 12-inch pipe.

Special Washing Machine

USE REPLY CARD—CIRCLE No. 9

Alvey-Ferguson Co., Cincinnati 9, O., offers a special washing machine built to remove grease and chips from rocker arm shafts after machining. The company employs a bar conveyor equipped with steel disks on which the main shafts ride. These disks not only



. . . removes grease, chips after machining

hold the shafts in place as the conveyor moves through the machine but also provide minimum contact points so maximum shaft surface is exposed for fast washing and drying.

Shafts pass through consecutive high-pressure, fan-shaped curtains of cleaning solution from above, below and from both sides. A hot blow-off unit is used for drying. Screen tank has two screens so one can be removed for cleaning without interrupting operation.

Torque Tool Range Increased

USE REPLY CARD—CIRCLE No. 10

Larger power-torque tools, offered by Garvin Brothers Inc., Box 563, South Bend, Ind., provide a torque range from 0 to 230 foot pounds for standard production models. Special tools can be custom-made for higher requirements. Because range of the larger models exceeds the operator's strength,

AMERICAN CHEMICAL PAINT COMPANY

AMBLER ACP PENNA.

Technical Service Data Sheet

Subject: HOW TO MAKE PAINT STICK TO GALVANIZED IRON WITH LITHOFORM®

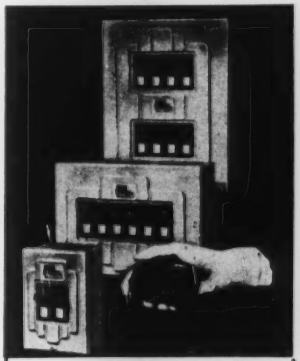
INTRODUCTION

"Lithoform" forms a dense, zinc phosphate coating on zinc, cadmium, and galvanized surfaces—including Galvanneal, cadmium plated steel, zinc plated steel, zinc base alloys, and zinc base die castings. The "Lithoform" coating, which is non-metallic and inactive, retards reaction between alkaline metal oxide and the paint film. Peeling and loss of adhesion are thus greatly retarded on painted Lithorized zinc and cadmium.

ADVANTAGES OF "LITHOFORM"

"Lithoform" forms a durable bond for paint. It is economical. It eliminates frequent repainting. It protects both the paint finish and the metal underneath. "Lithoform" meets these Government Finish Specifications:

QQ-P-416
RR-C-82
MIL-E-917A (Ships)
JAN-F-495
AN-F-20
U.S.N. Appendix 6



Photograph by courtesy of Murray Manufacturing Corp.

Murray Circuit Protectors are fully magnetic and provide maximum protection for both domestic and industrial wiring. Housings are of galvanized iron which is Spray Lithorized for long paint life.

THE LITHORIZING PROCESS

"Lithoform" can be applied by brushing or spraying the work with simple hand equipment, by dipping it in tanks, or by spraying it in industrial power washers.

Brush. Galvanized bay windows, cornices, rain gutters, hardware, building siding, truck panels, and farm equipment are typical of the many surfaces that are treated effectively with Brush "Lithoform".

Dip. This grade is used for coating cleaned surfaces of such typical products as cabinets, refrigeration condensers, etc., immersed in heated solutions in tanks.

Spray. The spray process is the most logical one with which to coat sheets, coiled strip or duplicate products best processed on a conveyor.

CHEMICALS ACP PROCESSES

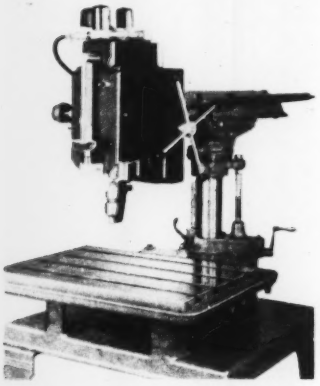
WRITE FOR FURTHER INFORMATION ON "LITHOFORM" AND ON YOUR OWN METAL PROTECTION PROBLEMS.

CHEMICALS ACP PROCESSES

Electro
TRADE MARK
Specific Purpose
Grinding Wheels
Only with specific purpose wheels engineered to your individual ways of working and to your objectives in each progressive step, can you hope to match competitive efficiency and economy. Let us send a technically trained Engineer without cost or obligation to you, to show you how the 3-way gains from use of Electro Specific Purpose Wheels can be introduced into your plant.
With them, you'll get more and better production and you'll reduce your production costs.

it is necessary to mount the unit. In the illustration, the model MA-500 is mounted on Walker-Turner radial drill press arms.

The larger stationary tools control torque at high speeds with accuracy within 2 per cent of prescribed torque limits. When used



. . . handles 0 to 230 foot-pounds

in production, no need exists for subsequent hand torquing inspection and scrap is reduced considerably. Tools are available with air powered, electric or high-cycle electric motors. A built-in reversing system is used on stud drivers.

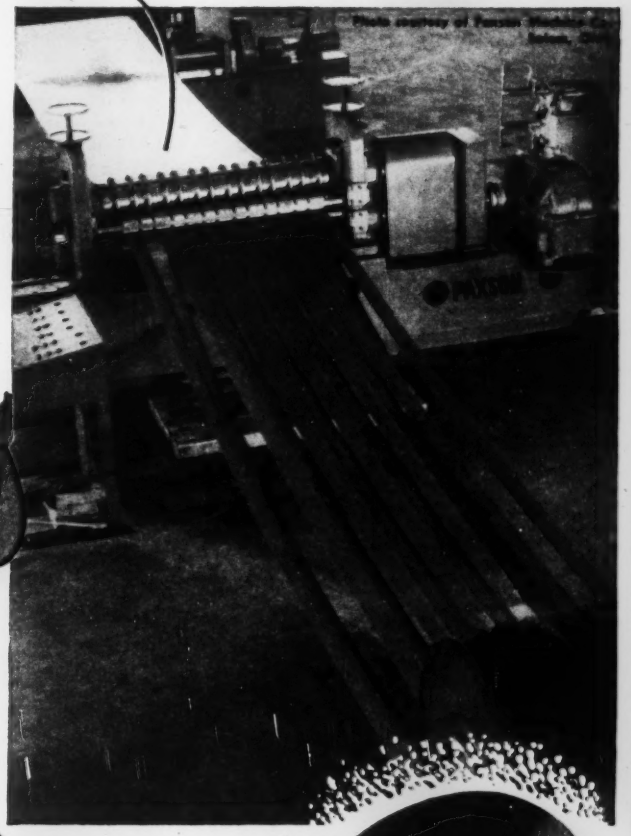
Ultrasonic Micrometer

USE REPLY CARD—CIRCLE No. 11

Ultrasonic thickness measurements, said to be made with a precision higher than was previously possible by this method, are recorded on an Audigage micrometer developed by Branson Instruments Inc., Stamford, Conn. Measurements are obtained within ½ of 1 per cent of actual thickness from one side of materials with smooth surface. Micrometer can be used on homogeneous materials such as steel and aluminum and on other dense substances capable of transmitting the ultrasonic waves generated by a vibrating crystal.

Micrometer measures thickness by determining the frequency at which resonance of the high-frequency sound waves occurs in the material under test. This resonance is indicated by maximum deflection of a meter and maximum strength of a tone audible in the

it's OK let 'er go!



the gang's all here

. . . ready to knock down production costs—because OK Gang Slitter Knives run hour after hour without re-grinding giving you top machine productivity at all times. Here's why: exact metallurgical specifications for our steel—an exclusive heat treating process to give uniform hardness and temper —special grinding and finishing to tolerances of ± .00025 or finer.

Producers for the Metal Working Industry of:

SLITTER KNIVES • SHEAR BLADES • ROTARY SHEAR KNIVES
HARDENED SPACERS • HARDENED WAYS, GIBS, RACES

GO WITH OHIO GREEN

THE OHIO KNIFE CO.

CINCINNATI 23, OHIO

headphones. The instrument is designed to operate over an infinite series of relatively narrow thickness ranges between 0.010-inch and 12 inches.

Collector Saves Diamond Dust

USE REPLY CARD—CIRCLE No. 12

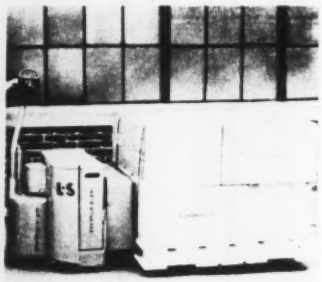
Economical means for salvaging industrial diamonds lost in the wearing away of diamond-impregnated grinding wheels and diamond-tipped tools used for truing and dressing grinding wheels is provided by a dust collector introduced by Torit Mfg. Co., 285 Walnut St., St. Paul 2, Minn. To collect dusts from machines where diamond wheels are used intermittently, mobile units mounted on casters are now available. These can be equipped with flexible suction tube assemblies, a combination that permits collectors to follow the diamond wheel around the shop and keep diamond dusts separate from ordinary operations.

Segregation of these dusts is done through filters constructed of an extra hard surfaced and tightly woven material. No particles can become enmeshed. A few strokes of the foot pedal shakes them into the storage tray at the bottom of the cabinet.

Lift Truck Power Increased

USE REPLY CARD—CIRCLE No. 13

Featured in a 4000 to 6000-pound capacity truck offered by Lewis-Shepard, Watertown, Mass., is increased power accomplished with decrease in length. Called the Jacklift electric, the truck's power is doubled in 15 per cent less headroom. Effect of the redesigned unit is greater power on ramps



more power, less overall length

and grades but reduced amount of space necessary for load maneuvering.

Other construction features include grouping of all controls in the handle head to provide rapid control over any maneuver. Controls operate with the handle in any position, including the vertical. Handle does not have to be extended down from the full back position to disengage the brake and make controls operable. Electric deadman-type brakes are employed.

Scrap Shear

USE REPLY CARD—CIRCLE No. 14

Paxson Machine Co., Salem, O., has developed a scrap shear that requires only four bolt holes for installation on a rotary type slitter. Its capacity is $\frac{3}{4}$-inch wide, $\frac{1}{8}$-inch material. Two individually motorized units run on a track mounted on the delivery side of the slitter and may be run in or

"No reason to hesitate, sir. Hundreds of firms have their gloves reconditioned."

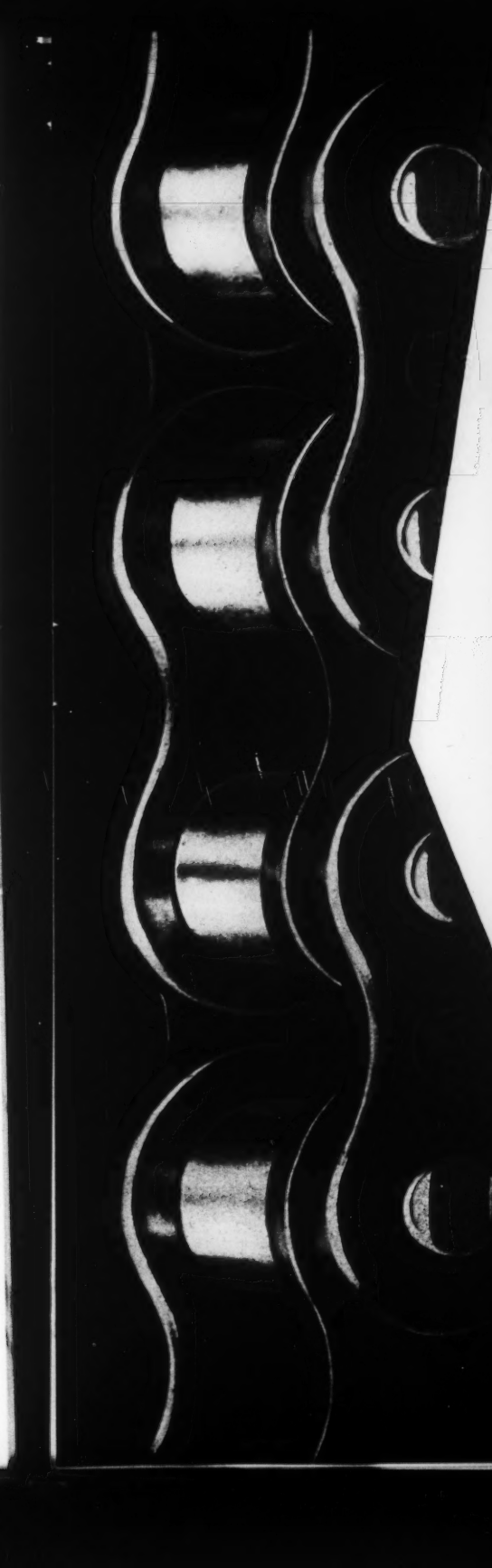
What Arthur may not know is that savings of approximately 50% are realized (by actual study) on industrial glove reconditioning.

Don't scrap dirty or worn canvas, leather palm or other type gloves. We pick them up, wash, sterilize, mend, reshape, pair and return them at substantial savings.

"Glovco National Service" also reconditions dust collector bags, conveyor belting, tarpaulins, drop cloths and filter bags.

Write today for full particulars. This service is national—coast to coast and Canada to the Gulf. Very likely you can adopt it in your shop.

U. S. INDUSTRIAL GLOVE CORP.
9360 Roselawn Ave. Detroit 4, Michigan



EVERY PART *Pre-tested* For EXTRA SERVICE

Pins, bushings, rollers, side plates . . . as raw material, after fabrication, during heat treating and before and after assembly are all "pre-tested" by Atlas. Every part or piece of metal that goes into a length of Atlas Chain is carefully "pre-tested" with the latest scientific equipment . . . tested and torture-tested again and again to assure extra service life.

This sturdy "pre-tested" longer life built into every length of Atlas Roller Chain means rugged toughness on every installation . . . with velvet smooth operation. That is why Atlas Roller Chain has won the name of the "super-life" roller chain. On drilling rigs, conveyors, large and small power drives and wherever roller chain is used Atlas Chain has won the reputation of more service with less servicing.

For maximum performance that has been "pre-tested" during manufacturing and performance-proved from coast to coast, install Atlas Roller Chain. Available through leading distributors throughout the nation. Write today for new Atlas handbook and catalog on roller chain. Atlas Chain & Manufacturing Co., Philadelphia 24, Pennsylvania.

ATLAS ROLLER CHAIN

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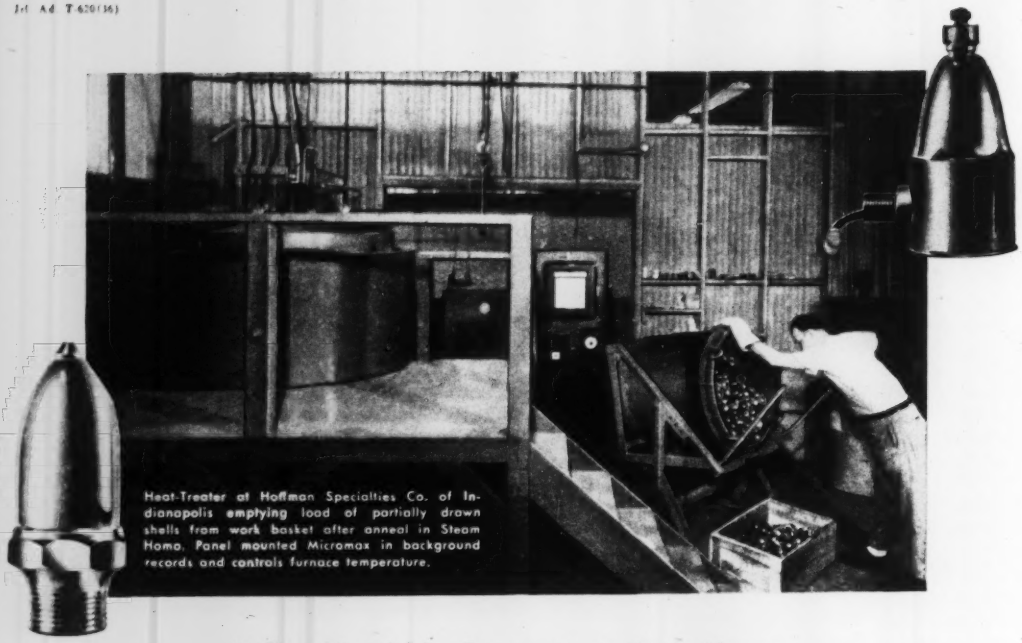

Heat-Treater at Hoffman Specialties Co. of Indianapolis emptying load of partially drawn shells from work basket after anneal in Steam Homo. Panel mounted Micromax in background records and controls furnace temperature.

Hoffman Specialties Co. reports on Steam Homo

"Increased Uniformity...Increased Quality of Brass Parts"

• Scale-free heat-treating of both non-ferrous and ferrous parts at temperatures to 1150 F is one of the big jobs that the versatile L&N Steam Homo is doing for industry. Brass and bronze parts, for example, are treated so effectively that they come out of the furnace not only uniform in quality, but really clean . . . many times ready for use "as is."

The experience of the Hoffman Specialties Co., manufacturers of heating system products, illustrates these points. They have noticed that Steam Homo does even more than increase the uniformity and quality of product components. There is also an increase in the life of the tools used on their products in operations following heat-treatment. This is attributed by Hoffman to two factors: (1) Uniformity in hardness of treated parts. (2) Better adherence of lubricants to treated parts.

Hoffman's experience is typical of many users. Wherever a steam atmosphere is indicated . . . for steam-treating high speed cutting tools . . . for safely and uniformly bluing iron and steel parts or for steam-treating powdered iron compacts after sintering L&N Steam Homo is being enthusiastically received and successfully applied.

Safe, compact Steam Homo equipment is ideal for installation directly in production lines. It can be placed on the floor (as above) or sunk in a pit. Check the advantages of this furnace with your nearest L&N representative or write 4957 Stenton Ave., Phila. 44, Pa.

CAREER OPPORTUNITIES AT L&N

Expansion program of this long-established firm has many features to attract outstanding recent graduates in engineering and science. Opportunities are in sales field engineering, product and application engineering, research, advertising, market development. Widely respected policies assure recognition of progress. Address Personnel Manager for preliminary interview at nearest of 17 L&N offices.

For full information about Steam Homo, send for the NEW 12 page catalog, "L&N Steam Homo Method for Heat-Treating."

LEEDS NORTHRUP

instruments automatic controls furnaces

out to accommodate various widths of strip.

Silicone Resin

USE REPLY CARD—CIRCLE No. 15

A silicone resin for class H electric insulation that maintains its bonding strength and hardness at temperatures 50 to 90 C above regular silicone resin is a development of General Electric's Chemical Division, Pittsfield, Mass. Known as SR-98, it is said to form a hard, tough insulating film.

Gear Grinder Wheels

USE REPLY CARD—CIRCLE No. 16

Worm face profiled gear grinder wheels in popular make gradings and pitches are available from Jerpbak-Bayless Co., Solon, O. Wheels are accurately formed with proper root clearances.

Electric Wire Rope Cutter

USE REPLY CARD—CIRCLE No. 17

Electric, motor-driven Hydrashear, offered by Pell Cable Cutter Co., San Francisco 5, Calif., will cut $1\frac{3}{4}$-inch wire rope in 20 seconds. It is powered by a $\frac{1}{2}$-hp 110/220 v, single phase motor-driven hydraulic pump that develops 10,000 pounds pressure per square inch.

Cement for Lining Tanks

USE REPLY CARD—CIRCLE No. 18

Fura-Tone 1347, an improved resin used as a chemical resistant cement, is announced by Irvington Varnish & Insulator Co., Irvington, N. J. It will not crack, check or warp and provides high tensile strength with less shrinkage.

Axle Load Scales

USE REPLY CARD—CIRCLE No. 19

Line of axle load scales introduced by Howe Scale Co., Rutland, Vt., includes nine standard models with capacity range of 15, 20 and 30 tons. Platform sizes are 4, 6, or 8 feet long by 10 feet wide.

High Sensitivity Inverter

USE REPLY CARD—CIRCLE No. 20

A synchronous inverter with a sensitivity of 0.005-microvolts and a dissymmetry of less than $\frac{1}{2}$ of 1 per cent is announced by Bristol Co., Waterbury 20, Conn. Known

CAN'T TH' FATHEADS TELL HE'S JUST PICKING UP A PAIR OF CALIPERS OR SUMPIN'? WHY IF HE WAS CAUGHT IN TH' MACHINE, IT WOULDN'T PULL HIM OVER, CUZ IT TURNS THIS WAY!
WELL, MAYBE THEY THINK HE WENT THRU UNDER IT ONCE - BUT THEY OUGHT TO REMEMBER SOL-SPEEDI-DRI HAS STOPPED SLIPPIN' ACCIDENTS HERE!
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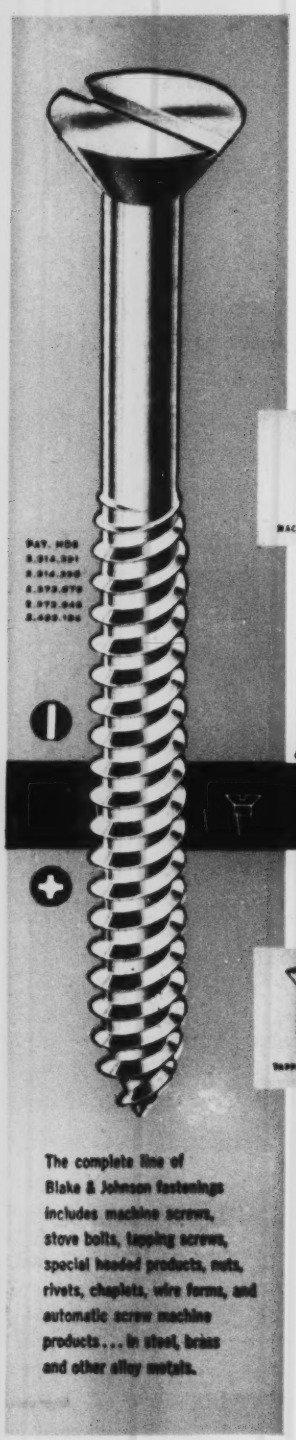
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2,409,106
The complete line of Blake & Johnson fastenings includes machine screws, stove bolts, tapping screws, special headed products, nuts, rivets, chaplets, wire forms, and automatic screw machine products... in steel, brass and other alloy metals.

Blake & Johnson is headquarters for patented **Twin-Fast®** twin thread wood screws now available with Phillips head as well as slotted round, flat and oval heads — in brass and steel, bright finished — in all standard lengths and diameters and some special sizes; others to order.

fastenings

Write for new catalog ▶

BLAKE & JOHNSON

SINCE 1849

WATERVILLE 48, CONNECTICUT

as Syncroverter switch, it is capable of converting low-power direct current signals, as low as 0.05-microvolts, to alternating voltages that can be amplified and applied to electronic, electrical and servo systems.

Combination Welder-Charger

USE REPLY CARD—CIRCLE No. 21

A combination alternating current arc welder and battery charger, reconnectable for 110 or 220-v operation, is announced by Mid-States Welding Mfg. Co., Chicago, Ill. It handles rods from 1/16 to 3/16-inch and is available without battery charging circuit. Amperage range is 15 to 175.

Prevents, Stops Rust

USE REPLY CARD—CIRCLE No. 22

Master Bronze Powder Co., Hammond, Ind., announces Derusto in an aluminum finish suitable for brushing, spraying or dipping. The protective coating contains Derustite to prevent and stop rust.

Die Casting Machine Lubricant

USE REPLY CARD—CIRCLE No. 23

Plunger Slick, a high temperature lubricant for cold chamber die casting machines, is reported by G. W. Smith & Sons Inc., Dayton, O. It plates plungers and cylinder walls with an adherent lubricating coating that will not run off at high temperatures. Plunger and cylinder are protected against corrosive action of molten aluminum.

Holders and Electrodes

USE REPLY CARD—CIRCLE No. 24

Heavy duty Nu-Twist holders and electrodes for spot welding forces over 6000 pounds are announced by P. R. Mallory & Co. Inc., Indianapolis 6, Ind. They are designed with flat mating surfaces between holder and electrode that eliminate threaded and tapered connections. Holders are available

USE A REPLY CARD

Just circle the corresponding number of any item in this section for more information.

Yours FOR THE ASKING

TEAR OUT CARD, FILL IN and MAIL TODAY!

72. Metal Cleaning Systems

J. P. Mfg. Co.—In 4 illustrated pages, this folder describes the various operations for degreasing, washing, stripping and cleaning as well as derusting, descaling, pickling and corrosion removal that can be performed in the 2500 series mechanical metal cleaning systems.

73. Drum Sander Wheel

Carborundum Co.—Now distributed exclusively by this company, Cone-Lok drum sanders are lightweight, balanced polishing wheels that accommodate short strips of coated abrasives torn from Economy rolls. When arbor nut is tightened, abrasive strip is held securely around wheel over rubber cushion. See bulletin A-1217.

74. Progressive Dies

B. Jahn Mfg. Co.—"The Story of B. Jahn" relates how this company produces progressive dies that are guaranteed to run in customer's equipment to his complete satisfaction. Typical dies that are production tested prior to delivery are shown. Service and equipment facilities of company to design and make tools and dies are described.

75. Heat Treating

Ajax Electric Co.—Seventeen ways in which submerged electrode salt bath furnaces can improve heat treating efficiency on ten specific applications in the temperature range of 1100 to 2400°F are described in 4-page illustrated bulletin 123-B.

76. Screws, Plugs & Pins

Standard Pressed Steel Co.—Complete specifications for the various types of Unbrako "Standards" are contained in 16-page illustrated catalog 729-1. Fasteners included are knurled socket head cap screws, flat head socket cap screws, self-locking knurled point socket set screws, knurled socket head shoulder screw, fully-formed pressure plug and precision ground dowel pin.

77. Nickel Deposit Properties

International Nickel Co. — Wide range of properties that can be obtained in electro-deposited nickel by varying the solution and plating procedure is shown in 12-page illustrated technical brochure "Mechanical Properties of Nickel Deposits." It contains 3 tables, 13 charts and numerous photomicrographs. Much data for the design engineer and plater are included.

78. High Pressure Pump

Kobe Inc.—Applications calling for pressures up to 5000 psi are shown and discussed in 6-page folder on the "Kobe High Pressure Triplex Pump." Special applications where up to 20,000 psi are required are described as well. Installation and operating data on the Triplex unit is given, and how on-the-job power variations can be effected by interchange of plungers and liners is told.

79. Building Maintenance

Flexrock Co.—Do you want a 64-page handbook, jammed with instructions and data on a complete line of building construction and maintenance products? If so, we suggest illustrated handbook No. 7 which deals with floor materials and finishes, construction and maintenance, leak stopping and moisture sealing. Step-by-step guidance is given on application of these products.

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80. Thermocouples & Parts

Leeds & Northrup Co.—44-page illustrated catalog EN-S2 gives information on complete line of standard thermocouple assemblies, as well as on parts and supplies. Covered are such data as accuracy limits of thermocouples, temperature and physical limitations of units and recommended protecting tube and well materials.

81. Modern Industry Aids

Klaas Machine & Mfg. Co.—"Aids to Modern Industry" is title of 8-page brochure which illustrates materials handling equipment and production machines made for unusual requirements. Featured is the Emco power punch press for forming, stenciling and riveting rubber, leather, plastics as well as metallic materials.

82. Spacing Tables

Bullard Co.—"The Norton Story of Bullard Spacers" is just what its name states. This 12-page illustrated bulletin explains in detail how spacer tables are used to advantage in the production of many components of cylindrical grinding machines. Typical setups, cost-saving procedures and machining operations performed on various parts are shown and described.

83. Plastic Rubber Extruders

Industrial Ovens, Inc., Allen Extrusion Machine Div.—Extrusion machines which operate integrally with high speed, constant tension materials handling and processing systems for rubber, plastics, wire and film are subject of 4-page bulletin. Clear diagrammatic views of the extruders and specifications of four models are given.

84. Metal Washing Equipment

Despatch Oven Co.—Typical metal washing units from single stage for simple wash jobs to multiple stage machines for the preparation of metal to receive the finest finishes are described and illustrated in 12-page bulletin No. 68. Several special layouts are shown and discussed to point out the versatility of this equipment.

85. Color On Corrugated

Hinde & Dauch Paper Co.—"How To Use Color on Corrugated Boxes" is the title of 28-page illustrated pocket-size booklet, No. 4 in the Little Packaging Library. The why's and wherefore's of color and its applications and combinations are covered. How it identifies the product, attracts attention, stimulates sales and shows off the product is told.

86. Locknuts

Industrial Fasteners Institute—24 pages of this booklet feature photographs, cross-sectional drawings of holding principle and descriptive data for many types of locknuts. Each section gives the names of companies manufacturing the various types and a brief description.

87. Surface Grinder

Reid Brothers Co.—Company has published 4-page bulletin which illustrates and describes in detail the 618 precision surface grinder, which is available in four models, having power feed tables or hand feed. Information on various attachments and accessories for grinder is included.

EDITORIAL REPRINTS:

88. Machine Tool Problems

Why there are problems ahead for machine tool builders is related in STEEL reprint entitled "Tool Builders Need Still More Business." Although the order backlog is high, bulk of it is in large special tools or popular general-purpose units and is placed with only about 60 of the 325 plants in the industry.

89. Build-Up In Steel

STEEL reprint entitled "Build-Up in Steel" lists all branches of leading steelmakers throughout country with their capacities as of July 1, 1952 and their anticipated production expansion by Jan. 1, 1953. Open hearth, Bessemer and electric processes are considered. Capacities and planned expansion for coal chemical recovery ovens are also tabulated.

90. Steel Expansion

"120 Million Tons of Steel—How Does It Match Our Economy?" is title of STEEL reprint which presents the opinions of leaders in the steel producing industry relative to this question. This "high" in steel production is anticipated for 1953 as a result of the construction of new steelmaking facilities. Government and labor leader's views as well as industry opinions are revealed.

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in 8 and 12-inch lengths and in $1\frac{1}{2}$, $1\frac{3}{4}$, 2 and $2\frac{1}{2}$-inch barrel diameters. Electrodes available are in Elkaloy A, Mallory 3 and 100 metal.

Wire Connectors

USE REPLY CARD—CIRCLE No. 25

DB wire connectors are available from Van Cleef Bros. Inc., Chicago 19, Ill., in four standard sizes. Made of phenolic material, they are said to be proof against shorts, grounding and vibration.

Lift Truck Scale

USE REPLY CARD—CIRCLE No. 26

Martin-Decker Corp., Long Beach 7, Calif., offers a small hydraulic lift scale that fits on any hydraulic cylinder type fork truck. It shows the driver how much weight he has picked up with the truck. Device is made in nine models ranging in capacity from 2000 to 18,000 pounds.

Universal Grinding Dog

USE REPLY CARD—CIRCLE No. 27

Red-E universal grinding machine dog, introduced by Ready Tool Co., Bridgeport 5, Conn., is made in two styles. No. 101 has a capacity of $\frac{1}{4}$ to $1\frac{1}{2}$ inches and No. 102 has a capacity of $1\frac{1}{4}$-inch to $2\frac{1}{2}$ inches. Device has a brass face design that eliminates marring and damaging of soft, finished or threaded work.

Drum Spray Pump

USE REPLY CARD—CIRCLE No. 28

Wilkinson Equipment & Supply Corp., Chicago, Ill., has developed a drum spray pump and control unit that allows spraying from the original material container. It fits any standard drum. Unit eleminates surge previously caused by pressure buildup when spray gun was turned off. Spray gun is the only control, its action shutting off pump and spray simultaneously.

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SIMONDS ABRASIVE CO.

Grinding Wheels

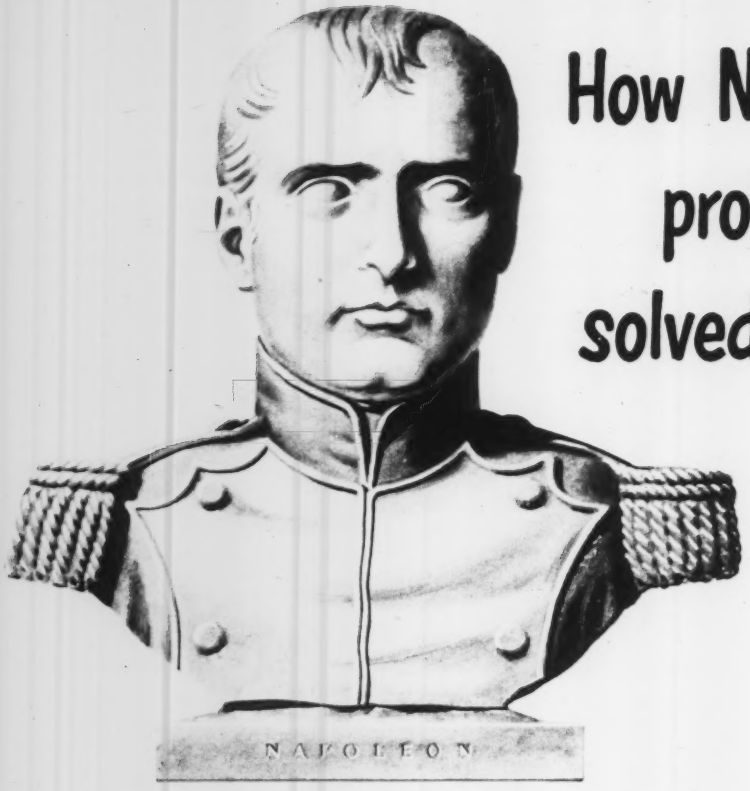
Resinoid or Vitrified bond? It's a question of speed!

For high speed grinding, the right answer is Simonds Resinoid bonded wheels. For low speed, it's Simonds Vitrified bonded wheels.

Right now *you* may have a grinding problem. Chances are that Simonds Abrasive Company's complete line has the right answer for you. It includes grinding wheels of every essential combination of grain, grade and bond—mounted wheels and points—segments and abrasive grain—accurately specified production tools available through your Simonds distributor. Let's send you his name, and free data book. Write

SIMONDS ABRASIVE CO. PHILADELPHIA 37, PA. BRANCH WAREHOUSES: CHICAGO, DETROIT, BOSTON. DISTRIBUTORS IN PRINCIPAL CITIES

Division of Simonds Saw and Steel Co., Fitchburg, Mass. Other Simonds Companies: Simonds Steel Mills, Lockport, N. Y., Simonds Canada Saw Co., Ltd., Montreal, Que. and Simonds Canada Abrasive Co., Ltd., Arvida, Que.



How Napoleon's problem solved yours

WHEN Napoleon offered a prize for the best way to feed his fighting armies — the first airtight container was born.

Today, a century and half later, this container has evolved into the familiar "tin can" — the end product of multi-billion-dollar industries, employing hundreds of thousands of people.

For all of us, the tin can has cut our work and improved our health by providing us with a balanced, nutritious diet throughout the year.

It permits us to enjoy the delicacies of many lands. It feeds our armed forces throughout the world.

In countless ways, the versatile can is an essential part of convenient, modern living — thanks to the continuing research and ingenuity of can manufacturers and the canning industry.

Kaiser Steel is proud to serve this great industry . . . through the production of tin plate at its new mill in Fontana.

It's good business to do business with

Kaiser Steel

built to serve the West

PROMPT, DEPENDABLE DELIVERY AT COMPETITIVE PRICES • plates • continuous weld pipe • electric weld pipe • tin plate • hot rolled strip • hot rolled sheet alloy bars • carbon bars • structural shapes • cold rolled strip • special bar sections • semi-finished steels • pig iron • coke oven by-products For details and specifications, write: **KAISER STEEL CORPORATION, LOS ANGELES, OAKLAND, SEATTLE, PORTLAND, HOUSTON, TULSA, NEW YORK**

The Market Outlook

STEEL OUTPUT in the United States is at a new high mark, and more new records will be set soon.

The latest record was cast in the week ended Oct. 4, when reports to STEEL indicated the nation's mills produced steel for ingots and castings at 103.5 per cent of capacity. Steel output has been slightly above 100 per cent of capacity before but never has the capacity been as great as it is now. The capacity will continue to climb for the next several months. Almost every week now brings reports of new steelmaking capacity coming into production.

The 103.5 per cent rate, a rise of 1 point over the preceding week, is equivalent to 2,150,000 net tons of steel for ingots and castings.

CATCHING UP—Increases in capacity plus full operations are making strong headway in pushing supply up into balance with demand. Proof of this is the growing cost consciousness among steel consumers. They are increasingly insistent on placing their steel orders at the nearest mill so that freight costs can be held down. As a result, mills farthest from big consuming areas are feeling a reduction in consumer pressure, while sellers nearest the big consuming areas are experiencing no let-up.

IMPROVED—The supply improvement is reflected also by a survey made by the National Association of Purchasing Agents. It finds that only 47 per cent of those answering in the survey have any steel supply problems now. An easy supply condition by the end of this year is expected by 44 per cent. Critical shortages running into the second quarter of 1953 are visualized by only 9 per cent, compared with 42 per cent a month ago.

EASIER—Reflecting the improvement in supply more carbon sheets and narrow cold-rolled strip will be available in the first quarter than was anticipated earlier. While March was expected to be the first open month on nondefense sheet orders some producers now expect to have openings sooner than that. Some customers are passing up offerings, either because of lack of government allotments or because of sufficient inventories. The government limits inventories to 30-day supplies. Some debate is going on as to whether a liberalization of government restrictions on inventories would swell demand for steel.

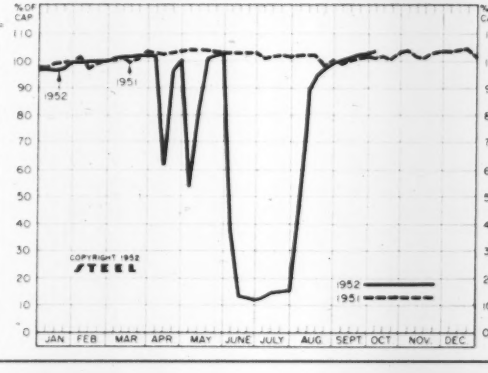
TIME OUT—Still there are gaps to be filled between supply and demand. Most of these deficiencies can be blamed on the steelworkers' strike. Because of a shortage of steel, 150 employees of the Erie, Pa., works of General Electric Co.'s locomotive division are being furloughed temporarily or transferred to other departments. Also feeling a steel supply pinch are structural steel fabricators who operated at a fast pace during the steel strike and cut heavily into their inventories.

SIGNS OF TIMES—These shortages of steel will not always exist and then the new uses developing now for steel will be recognized for their full worth. One of these is the use of enameling steel sheets in the place of glass or stainless steel for making cones of large television tubes. One eastern television manufacturer is ordering substantial tonnages of enameling stock. Meanwhile, a midwestern steel producer is turning down such orders because of full order books.

The relatively new air conditioning industry is stepping up its demand for steel. Spurred by the unusually torrid summer which made a hot demand for air conditioners, the producers of them are stepping up production now in preparation for next summer.

Another interesting development in demand is taking place in the shipbuilding industry. While shipbuilding takes an increasing volume of stainless steel per ship, a larger-than-usual tonnage of nickel-bearing stainless in heavier shapes is going into minesweeper construction. These ships must be as nonmagnetic as possible, so nonmagnetic nickel-bearing stainless finds a place here.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended Oct. 4	Change	Same Week 1951	Same Week 1950
Pittsburgh	105	+ 2*	99.5	102
Chicago	106.5	+ 1*	107.5	102
Mid-Atlantic	98	0	100	99
Youngstown	106	0	94	106
Wheeling	97.5	0	96.5	99.5
Cleveland	105	+ 3*	102	98.5
Buffalo	106	+ 1.5	104	104
Birmingham	101	0	104	100
New England	87	+ 2	90	82
Cincinnati	90	+ 5	100	99
St. Louis	108	+ 1.5	88.5	94
Detroit	108	+ 1.5	103.5	106
Western	102.5	+ 0.5	103	103
Estimated national rate	103.5	+ 1	101	101.5

Based on weekly steelmaking capacity of 2,027,040 tons in 1952, 1,996,034 tons for 1951, 1,928,721 tons for second half, 1950, 1,906,288 tons for first half, 1950.

* Change from revised rate for preceding week.

Composite Market Averages

FINISHED STEEL PRICE INDEX: Bureau of Labor Statistics	Sept. 30, 1952	Sept. 23, 1952	Month Ago	August Average
(1947-1949 = 100)	130.7	130.7	130.8	130.8

AVERAGE PRICES (BUREAU OF LABOR STATISTICS)
Week Ended Sept. 30, 1952

Units are 100 lb except where otherwise noted below in parentheses. For complete description of products see insert following p. 28, STEEL, Sept. 8, 1952

Rails	$3.775	Sheets, C.R. carbon	$5.275
Track spikes	6.650	Sheets, galv.	6.995
Track bolts	9.558	Strip, C.R. carbon	5.100
Tie plates	4.775	Strip, C.R. stainless (lb)	0.325
Joint bars	4.925	Pipe, black, buttweld (100 ft)	7.090
Plates, carbon	4.150	Pipe, galv. buttweld (100 ft)	9.106*
Structural shapes	4.200	Boiler tubes (100 ft)	31.360
Bars, tool steel (lb)	1.578	Tin plate (100 lb base box)	8.950
Bars, 3120 alloy	6.575	Terne plate (100 lb base box)	7.750
Bars, stainless (lb)	0.149	Wire, carbon, merchant	6.075
Bars, carbon	4.100	Wire, fence, galv.	6.485
Bars, reinforcing	4.050	Nails (100 lb keg)	7.380
Bars, C.F. carbon	5.925	Wire, barbed, 80 rod spool	5.940*
Sheets, H.R. carbon	4.125	Woven wire fence (20 rod roll)	13.765*

* Revised and effective as of Sept. 23

FINISHED STEEL PRICE INDEX, Weighted: Calculated by STEEL*	Oct. 2, 1952	Week Ago	Month Ago	Year Ago	5 Yrs Ago
Index (1935-39 av. = 100)	181.40	181.40	181.40	171.92	128.96
Index in cents per lb	4.914	4.914	4.914	4.657	3.494

ARITHMETICAL PRICE COMPOSITES: Calculated by STEEL*					
Finished Steel, NT	$111.66	$111.66	$111.66	$106.32	$75.41
No. 2 Fdry. Pig Iron, GT	55.04	55.04	55.04	52.54	36.59
Basic Pig Iron, GT	54.66	54.66	54.66	52.16	36.13
Malleable Pig Iron, GT	55.77	55.77	55.77	53.27	37.13
Steelmaking Scrap, GT	43.00	43.00	43.00	43.00	37.92

* For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composites, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS	Oct. 2, 1952	Week Ago	Month Ago	Year Ago	5 Yrs Ago
Bars, H.R., Pittsburgh	3.95	3.95	3.95	3.70	2.90
Bars, H.R., Chicago	3.95	3.95	3.95	3.70	2.90
Bars, H.R., del. Philadelphia	4.502	4.502	4.502	4.223	3.28
Bars, C.F., Pittsburgh	4.925	4.925	4.925	4.55	3.55
Shapes, Std., Pittsburgh	3.85	3.85	3.85	3.65	2.80
Shapes, Std., Chicago	3.85	3.85	3.85	3.65	2.80
Shapes, del. Philadelphia	4.13	4.13	4.13	3.918	2.94
Plates, Pittsburgh	3.90	3.90	3.90	3.70	2.95
Plates, Chicago	3.90	3.90	3.90	3.70	2.95
Plates, Coatesville, Pa.	4.35	4.35	4.35	4.15	3.15
Plates, Sparrows Point, Md.	3.90	3.90	3.90	3.70	2.95
Plates, Claymont, Del.	4.35	4.35	4.35	4.15	3.15
Sheets, H.R., Pittsburgh	3.775	3.775	3.775	3.60-75	2.80
Sheets, H.R., Chicago	3.775	3.775	3.775	3.60	2.80
Sheets, C.R., Pittsburgh	4.575	4.575	4.575	4.35	3.55
Sheets, C.R., Chicago	4.575	4.575	4.575	4.35	3.55
Sheets, C.R., Detroit	4.775	4.775	4.775	4.55	3.70
Sheets, Galv., Pittsburgh	5.075	5.075	5.075	4.80	3.90
Strip, H.R., Pittsburgh	3.75-4.225	3.75-4.225	3.75-4.225	3.75-4.00	2.80
Strip, H.R., Chicago	3.725	3.725	3.725	3.50	2.80
Strip, C.R., Pittsburgh	5.10-5.80	5.10-5.80	5.10-5.80	4.85-5.35	3.55
Strip, C.R., Chicago	5.35	5.35	5.35	4.90	3.65
Strip, C.R., Detroit	5.30-6.05	5.30-6.05	5.30-6.05	4.85-5.60	3.70
Wire, Basic, Pittsburgh	5.10-5.225	5.10-5.225	5.10-5.225	4.85-5.10	3.675
Nails, Wire, Pittsburgh	6.20-6.35	6.20-6.35	6.20-6.35	5.90-6.20	4.25
Tin plate box, Pittsburgh	$8.95	$8.95	$8.95	$8.70	$5.75

SEMIFINISHED					
Billets, forging, Pitts. (NT)	$70.50	$70.50	$70.50	$66.00	$56.50
Wire rods, ¼" to ⅜", Pitts.	4.325	4.325	4.325	4.10-30	2.925

PIG IRON, Gross Ton					
Bessemer, Pitts.	$55.50	$55.50	$55.50	$53.00	$37.00
Basic, Valley	54.50	54.50	54.50	52.00	36.00
Basic, del. Phila.	59.25	59.25	59.25	56.61	38.72
No. 2 Fdry., Pitts.	55.00	55.00	55.00	52.50	36.50
No. 2 Fdry., Chicago	55.00	55.00	55.00	52.50	36.00
No. 2 Fdry., Valley	55.00	55.00	55.00	52.50	36.50
No. 2 Fdry., del. Phila.	59.75	59.75	59.75	57.11	39.22
No. 2 Fdry., Birm.	51.38	51.38	51.38	48.88	34.88
No. 2 Fdry. (Birm.) del. Cin.	58.93	58.93	58.93	55.43	38.25
Malleable, Valley	55.00	55.00	55.00	52.50	36.50
Malleable, Chicago	55.00	55.00	55.00	52.50	36.50
Charcoal, Lyles, Tenn.	68.50	68.50	68.50	66.00	44.00
Ferromanganese, Etna, Pa.	228.00	228.00	228.00	188.00	140.25*

F.o.b. cars, Pittsburgh

SCRAP, Gross Ton (including broker's commission)					
No. 1 Heavy Melt., Pitts.	$44.00	$44.00	$44.00	$45.00	$38.00
No. 1 Heavy Melt., E. Pa.	41.50	41.50	41.50	43.50	36.75
No. 1 Heavy Melt., Chicago	42.50	42.50	42.50	43.50	38.75
No. 1 Heavy Melt., Valley	44.00	44.00	44.00	45.00	40.00
No. 1 Heavy Melt., Cleve.	43.00	43.00	43.00	44.00	38.25
No. 1 Heavy Melt., Buffalo	43.00	43.00	43.00	44.00	39.50
Rails, Rerolling, Chicago	52.50	52.50	52.50	52.50	46.25
No. 1 Cast, Chicago	50.00	50.00	50.00	49.00†	43.50

* Nominal. † F.o.b. shipping point.

COKE, Net Ton					
Beehive, Furn., Connlsv.	$14.75	$14.75	$14.75	$14.75	$11.50-12.50
Beehive, Fdry., Connlsv.	17.00	17.00	17.00	17.50	14.00-15.00
Oven, Fdry., Chicago	23.00	23.00	23.00	23.00	17.50

PIG IRON

F.o.b. furnace prices quoted under GCPR as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax. Key to producing companies published on second following page.

PIG IRON, Gross Ton	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa. B2	$56.50	$57.00	$57.50	$58.00
NewYork, del.	....	60.78	61.28	....
Newark, del.	59.52	60.02	60.52	61.02
Philadelphia, del.	59.25	59.75	60.25	60.75
Birmingham District				
AlabamaCity, Ala. R2	50.88	51.38	....	....
Birmingham R2	50.88	51.38	....	....
Birmingham S9	....	51.38	....	....
Woodward, Ala. W15	50.88	51.38	....	....
Cincinnati, del.	....	58.93	....	....
Buffalo District				
Buffalo R2	54.50	55.00	55.50	....
Buffalo H1	54.50	55.00	55.50	....
Tonawanda, N.Y. W12	54.50	55.00	55.50	....
No. Tonawanda, N.Y. T9	....	55.00	55.50	....
Boston, del.	65.15	65.65	66.15	....
Rochester, N.Y., del.	57.52	58.02	58.52	....
Syracuse, N.Y., del.	58.62	59.12	59.62	....
Chicago District				
Chicago I-3	54.50	55.00	55.00	55.50
Gary, Ind. U5	54.50	....	55.00	....
IndianaHarbor, Ind. I-2	54.50	....	55.00	....
So. Chicago, Ill. W14	54.50	55.00	55.00	....
So. Chicago, Ill. Y1	54.50	55.00	55.00	....
So. Chicago, Ill. U5	54.50	....	55.00	55.50
Milwaukee, del.	56.67	57.17	57.17	57.67
Muskegon, Mich., del.	....	61.30	61.30	....
Cleveland District				
Cleveland A7	54.50	55.00	55.00	55.50
Cleveland R2	54.50	55.00	55.00	....
Akron, O., del. from Cleve.	57.11	57.61	57.61	58.11
Lorain, O. N3	54.50	....	....	55.50
Duluth I-3	....	....	55.00	....
Erie, Pa. I-3	54.50	55.00	55.00	55.50
Everett, Mass. E1	....	59.25	59.75	....
Fontana, Calif. K1	60.50	61.00	....	....
GraniteCity, Ill. G4	56.40	56.90	57.40	....
St. Louis, del. (inc. tax)	57.15	57.65	58.15	....
Ironton, Utah C11	54.50	55.00	....	....
Geneva, Utah C11	54.50	55.00	....	....
LoneStar, Tex. L6	50.50	*51.00	51.00	....
Minnequa, Colo. C10	56.50	57.50	57.50	....
Rockwood, Tenn. T3	....	....	58.50	....
Pittsburgh District				
Nevillelsland, Pa. P6	....	55.00	55.00	55.50
Pitts., N.&S. sides, Ambridge				
Aliquippa, del.	....	56.37	56.37	56.87
McKeesRocks, del.	....	56.04	56.04	56.54
Lawrenceville, Homestead,				
Wilmerding, Monaca, del.	....	56.66	56.66	57.16
Verona, Trafford, del.	....	57.19	57.19	57.69
Brackenridge, del.	....	57.45	57.45	57.95
Bessemer, Pa. U5	54.50	....	55.00	55.50
Clairton, Rankin, So. Duquesne, Pa. U5	54.50	....	....	....
McKeesport, Pa. N3	54.50	....	....	55.50
Monessen, Pa. P7	56.50	....	....	....
Sharpsville, Pa. S6	....	....	55.00	55.50
Steelton, Pa. B2	56.50	57.00	57.50	58.00
Swedeland, Pa. A3	58.50	59.00	59.50	60.00
Toledo, O. I-3	54.50	55.00	55.00	55.50
Cincinnati, del.	59.97	60.47	....	....
Troy, N.Y. R2	56.50	57.00	57.50	58.00
Youngstown District				
Hubbard, O. Y1	54.50	55.00	55.00	....
Youngstown Y1	54.50	55.00	55.00	....
Youngstown U5	54.50	....	....	55.50
Mansfield, O., del.	59.15	59.65	59.65	60.15

* Low phos, southern grade.

PIG IRON DIFFERENTIAL

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.
Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.
Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.
Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.0-6.50% silicon; add $1.50 for each 0.5% Si)

Jackson, O. G2, J1	$65.50
Buffalo H1	66.75

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls, N.Y. P15	$91.00
Keokuk, Iowa, Openhearth & Fdry. frt. allowed K2	92.50
Keokuk, OH & Fdry., 12¾ lb piglets, 16% Si, frt. allowed K2	95.50
Wenatchee, Wash., OH & Fdry., frt. allowed K2	92.50

CHARCOAL PIG IRON, Gross Ton

(Low phos semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles, Tenn. T3	$68.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$59.50
Steelton, Pa. B2	62.50
Philadelphia, delivered	66.05
Troy, N.Y. R2	62.50

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Semifinished and Finished Steel Products

Mill prices quoted under GCPR as reported to STEEL, Oct. 2, 1952, cents per pound except as otherwise noted. Changes shown in italics.
Code numbers following mill points indicate producing company, key on next two pages.

INGOTS, Carbon, Forging (NT)
Fontana,Calif. K1 ..... $81.00
Munhall,Pa. U5 ..... 54.00
Seattle N14 ..... 75.00

INGOTS, Alloy (NT)
Detroit R7 ..... $57.00
Fontana,Calif. K1 ..... 83.00
Houston S6 ..... 65.00
Midland,Pa. C18 ..... 54.00
Munhall,Pa. U5 ..... 57.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 ..... $59.00
Clairton,Pa. U5 ..... 59.00
Ensley,Ala. T2 ..... 59.00
Fairfield,Ala. T2 ..... 59.00
Fontana,Calif. K1 ..... 78.00
Gary,Ind. U5 ..... 59.00
Johnstown,Pa. B2 ..... 59.00
Lackawanna,N.Y. B2 ..... 59.00
Munhall,Pa. U5 ..... 59.00
So.Chicago,Ill. U5 ..... 59.00
So.Duquesne,Pa. U5 ..... 59.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ..... $70.50
Buffalo R2 ..... 70.50
Canton,O. R2 ..... 70.50
Clairton,Pa. U5 ..... 70.50
Cleveland R2 ..... 70.50
Conshohocken,Pa. A3 ..... 77.50
Detroit R7 ..... 73.50
Ensley,Ala. T2 ..... 70.50
Fairfield,Ala. T2 ..... 70.50
Fontana,Calif. K1 ..... 89.50
Gary,Ind. U5 ..... 70.50
Geneva,Utah C11 ..... 70.50
Houston S6 ..... 78.50
Johnstown,Pa. B2 ..... 70.50
Lackawanna,N.Y. B2 ..... 70.50
LosAngeles B3 ..... 89.50
Munhall,Pa. U5 ..... 70.50
Seattle B3 ..... 89.50
So.Chicago R2,U5,W14 ..... 70.50
So.Duquesne,Pa. U5 ..... 70.50
So.SanFrancisco B3 ..... 89.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..... $76.00
Buffalo R2 ..... 76.00
Canton,O. R2 ..... 76.00
Canton,O. T7 ..... 78.60
Conshohocken,Pa. A3 ..... 83.00
Detroit R7 ..... 79.00
Fontana,Calif. K1 ..... 95.00
Gary,Ind. U5 ..... 76.00
Houston S6 ..... 84.00
Ind.Harbor,Ind. Y1 ..... 76.00
Johnstown,Pa. B2 ..... 76.00
Lackawanna,N.Y. B2 ..... 76.00
LosAngeles B3 ..... 96.00
Massillon,O. R2 ..... 76.00
Midland,Pa. C18 ..... 70.00
Munhall,Pa. U5 ..... 76.00
So.Chicago R2,U5,W14 ..... 76.00
So.Duquesne,Pa. U5 ..... 76.00
Struthers,O. Y1 ..... 76.00
Warren,O. C17 ..... 76.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 ..... $87.50
Canton,O. R2 ..... 87.50
Cleveland R2 ..... 87.50
Fontana,Calif. K1 ..... 108.50
Gary,Ind. U5 ..... 87.50
Massillon,O. R2 ..... 87.50
So.Chicago,Ill. R2 ..... 87.50
So.Duquesne,Pa. U5 ..... 87.50

SHEET BARS (NT)
Fontana,Calif. K1 (43) $89.00

SKELP
Aliquippa,Pa. J5 ..... $3.65
Munhall,Pa. U5 ..... 3.55
Warren,O. R2 ..... 3.55
Youngstown R2, U5 ..... 3.55

WIRE RODS
Alton,Ill. L1 ..... 4.70
AlabamaCity,Ala. R2 ..... 4.325
Buffalo W12 ..... 4.325
Cleveland A7 ..... 4.325
Donora,Pa. A7 ..... 4.325
Fairfield,Ala. T2 ..... 4.325
Fontana,Calif. K1 ..... 5.125
Houston S6 ..... 4.725
Johnstown,Pa. B2 ..... 4.325
Joliet,Ill. A7 ..... 4.325
Kansas City,Mo. S6 ..... 4.60
LosAngeles B3 ..... 5.125
Minnequa,Colo. C10 ..... 4.575
Monessen,Pa. P7 ..... 4.30
No.Tonawanda,N.Y. B11 ..... 4.325
Pittsburg,Calif. C11 ..... 4.975
Portsmouth,O. P12 ..... 4.525
Roebling,N.J. R5 ..... 4.425
So.Chicago,Ill. R2 ..... 4.325
Sparrows Point,Md. B2 ..... 4.425
Sterling,Ill.(1) N15 ..... 4.325
Struthers,O. Y1 ..... 4.325
Torrance,Calif. C11 ..... 5.125
Worcester,Mass. A7 ..... 4.625

SHEET STEEL PILING
Ind.Harbor,Ind. I-2 ..... 4.675
Lackawanna,N.Y. B2 ..... 4.675
Munhall,Pa. U5 ..... 4.675
So.Chicago,Ill. U5 ..... 4.675

STRUCTURALS
Carbon Steel Stand. Shapes
AlabamaCity,Ala. R2 ..... 3.85
Aliquippa,Pa. J5 ..... 3.85
Bessemer,Ala. T2 ..... 3.85
Bethlehem,Pa. B2 ..... 3.90
Clairton,Pa. U5 ..... 3.85
Fairfield,Ala. T2 ..... 3.85
Fontana,Calif. K1 ..... 4.45
Gary,Ind. U5 ..... 3.85
Geneva,Utah C11 ..... 3.85
Houston S6 ..... 4.25
Ind.Harbor,Ind. I-2 ..... 3.85
Johnstown,Pa. B2 ..... 3.90
Kansas City,Mo. S6 ..... 4.45
Lackawanna,N.Y. B2 ..... 3.90
LosAngeles B3 ..... 4.45
Minnequa,Colo. C10 ..... 4.30
Munhall,Pa. U5 ..... 3.85
Niles,Calif.(22) P1 ..... 4.56
Phoenixville,Pa. P4 ..... 6.10
Seattle B3 ..... 4.50
So.Chicago,Ill. U5, W14 ..... 3.85
So.SanFrancisco B3 ..... 4.40
Torrance,Calif. C11 ..... 4.45
Munhall,Pa. U5 ..... 3.85
Weirton,W.Va. W6 ..... 4.10

Wide Flange
Bethlehem,Pa. B2 ..... 3.90
Clairton,Pa. U5 ..... 3.85
Fontana,Calif. K1 ..... 4.85
Johnstown,Pa. B2 ..... 3.90
Lackawanna,N.Y. B2 ..... 3.90
Munhall,Pa. U5 ..... 3.85
So.Chicago,Ill. U5 ..... 3.85

Alloy Stand. Shapes
Clairton,Pa. U5 ..... 4.725
Fontana,Calif. K1 ..... 5.925
Gary,Ind. U5 ..... 4.725
Munhall,Pa. U5 ..... 4.725
So.Chicago,Ill. U5 ..... 4.725

H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 ..... 5.80
Bessemer,Ala. T2 ..... 5.80
Bethlehem,Pa. B2 ..... 5.80
Clairton,Pa. U5 ..... 5.80
Fairfield,Ala. T2 ..... 5.80
Fontana,Calif. K1 ..... 6.40
Gary,Ind. U5 ..... 5.80
Geneva,Utah C11 ..... 5.80
Ind.Harbor,Ind. I-2 ..... 5.80
Ind.Harbor,Ind. Y1 ..... 6.30
Johnstown,Pa. B2 ..... 5.80
Lackawanna,N.Y. B2 ..... 5.80
LosAngeles B3 ..... 6.35
Munhall,Pa. U5 ..... 5.80
Seattle B3 ..... 6.40
So.Chicago,Ill. U5 ..... 5.80
So.SanFrancisco B3 ..... 6.30
Struthers,O. Y1 ..... 6.30

H.S., L.A. Wide Flange
Aliquippa,Pa. J5 ..... 5.50
Bethlehem,Pa. B2 ..... 5.80
Lackawanna,N.Y. B2 ..... 5.80
Munhall,Pa. U5 ..... 5.75
So.Chicago,Ill. U5 ..... 5.75

BEARING PILES
Munhall,Pa. U5 ..... 3.85
So.Chicago,Ill. U5 ..... 3.85

PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 ..... 5.95
Bessemer,Ala. T2 ..... 5.95
Clairton,Pa. U5 ..... 5.95
Cleveland J5, R2 ..... 5.95
Conshohocken,Pa. A3 ..... 6.20
Ecorse,Mich. G5 ..... 6.90
Fairfield,Ala. T2 ..... 5.95
Fontana,Calif.(30) K1 ..... 6.55
Gary,Ind. U5 ..... 5.95
Geneva,Utah C11 ..... 5.95
Ind.Harbor,Ind. I-2 ..... 5.95
Ind.Harbor,Ind. Y1 ..... 6.45
Johnstown,Pa. B2 ..... 5.95
Munhall,Pa. U5 ..... 5.95
Pittsburgh J5 ..... 5.95
Seattle B3 ..... 6.85
Sharon,Pa. S3 ..... 5.95
So.Chicago,Ill. U5 ..... 5.95
SparrowsPoint,Md. B2 ..... 5.95
Warren,O. R2 ..... 5.95
Youngstown Y1 ..... 6.45
Youngstown U5 ..... 5.95

PLATES, Open-Hearth Alloy
Claymont,Del. C22 ..... 5.35
Coatesville,Pa. L7 ..... 5.75
Conshohocken,Pa. A3 ..... 5.55
Fontana,Calif. K1 ..... 6.20
Gary,Ind. U5 ..... 5.25
Johnstown,Pa. B2 ..... 5.25
Munhall,Pa. U5 ..... 5.25
Sharon,Pa. S3 ..... 5.70
So.Chicago,Ill. U5 ..... 5.25
SparrowsPoint,Md. B2 ..... 5.25

FLOOR PLATES
Cleveland J5 ..... 4.95
Conshohocken,Pa. A3 ..... 4.95
Ind.Harbor,Ind. I-2 ..... 4.95
Munhall,Pa. U5 ..... 4.95
So.Chicago,Ill. U5 ..... 4.95

PLATES, Ingot Iron
Ashland,c.l. (15) A10 ..... 4.15
Cleveland,c.l. R2 ..... 4.50
Warren,O.,c.l. R2 ..... 4.50

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..... 3.90
Aliquippa,Pa. J5 ..... 3.90
Ashland,Ky. (15) A10 ..... 3.90
Bessemer,Ala. T2 ..... 3.90
Clairton,Pa. U5 ..... 3.90
Claymont,Del. C22 ..... 4.35
Cleveland J5, R2 ..... 3.90
Coatesville,Pa. L7 ..... 4.35
Conshohocken,Pa. A3 ..... 4.35
Ecorse,Mich. G5 ..... 4.45
Fairfield,Ala. T2 ..... 3.90
Fontana,Calif.(30) K1 ..... 4.50
Gary,Ind. U5 ..... 3.90
GraniteCity,Ill. G4 ..... 4.60
Geneva,Utah C11 ..... 3.90
Harrisburg,Pa. C5 ..... 6.50
Houston S6 ..... 4.40
Ind.Harbor,Ind. I-2, Y1 ..... 3.90
Johnstown,Pa. B2 ..... 3.90
Lackawanna,N.Y. B2 ..... 3.90
Minnequa,Colo. C10 ..... 4.70
Munhall,Pa. U5 ..... 3.90
Pittsburgh J5 ..... 3.90
Seattle B3 ..... 4.80
Sharon,Pa. S3 ..... 4.15
So.Chicago,Ill. U5, W14 ..... 3.90
SparrowsPoint,Md. B2 ..... 3.90
Steubenville,O. W10 ..... 3.90
Warren,O. R2 ..... 3.90
Weirton,W.Va. W6 ..... 4.20
Youngstown R2, U5, Y1 ..... 3.90

PLATES, Carbon A.R.
Fontana,Calif. K1 ..... 5.65
Geneva,Utah C11 ..... 5.05

PLATES, Wrought Iron
Economy,Pa. B14 ..... 8.60

BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 ..... 3.95
Aliquippa,Pa. J5 ..... 3.95
Alton,Ill. L1 ..... 4.50
Atlanta,Ga. A11 ..... 4.50
Bessemer,Ala. T2 ..... 3.95
Buffalo R2 ..... 3.95
Canton,O. R2 ..... 3.95
Clairton,Pa. U5 ..... 3.95
Cleveland R2 ..... 3.95
Detroit R7 ..... 4.10
Ecorse,Mich. G5 ..... 4.30
Emeryville,Calif. J7 ..... 4.70
Fairfield,Ala. T2 ..... 3.95
Fontana,Calif. K1 ..... 4.65
Gary,Ind. U5 ..... 3.95
Houston S6 ..... 4.45
Ind.Harbor,Ind. I-2, Y1 ..... 3.95
Johnstown,Pa. B2 ..... 3.95
Kansas City,Mo. S6 ..... 4.55
Lackawanna,N.Y. B2 ..... 3.95
LosAngeles B3 ..... 4.65
Milton,Pa. B6 ..... 4.55
Minnequa,Colo. C10 ..... 4.40
Niles,Calif. P1 ..... 4.65
N.Tonawanda,N.Y. B11 ..... 3.95
Pittsburg,Calif. C11 ..... 4.65
Pittsburgh J5 ..... 3.95
Seattle B3, N14 ..... 4.70
So.Chicago R2,U5,W14 ..... 3.95
So.Duquesne,Pa. U5 ..... 3.95
So.SanFran.,Cal. B3 ..... 4.70
Sterling,Ill. N15 ..... 4.55
Struthers,O. Y1 ..... 3.95
Torrance,Calif. C11 ..... 4.65
Weirton,W.Va. W6 ..... 4.10
Youngstown R2, U5 ..... 3.95

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 ..... 3.95
Atlanta,A11 ..... 4.50
Niles,Calif. P1 ..... 4.65
SanFrancisco S7 ..... 5.00

BAR SIZE ANGLES; H.R.CARBON
Bethlehem,Pa. B2 ..... 4.15

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 ..... 4.675
Buffalo R2 ..... 4.675
Canton,O. R2 ..... 4.675
Canton,O. T7 ..... 4.72
Clairton,Pa. U5 ..... 4.675
Detroit R7 ..... 4.825
Ecorse,Mich. G5 ..... 5.025
Fontana,Calif. K1 ..... 5.725
Gary,Ind. U5 ..... 4.675
Houston S6 ..... 4.625
Ind.Harbor,Ind. I-2, Y1 ..... 4.675
Johnstown,Pa. B2 ..... 4.675
Kansas City,Mo. S6 ..... 4.775
Lackawanna,N.Y. B2 ..... 4.675
LosAngeles B3 ..... 5.725
Massillon,O. R2 ..... 4.675
Midland,Pa. C18 ..... 4.30
So.Chicago R2,U5,W14 ..... 4.675
So.Duquesne,Pa. U5 ..... 4.675
Struthers,O. Y1 ..... 4.675
Warren,O. C17 ..... 4.675
Youngstown U5 ..... 4.675

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 ..... 4.925
Gary,Ind. U5 ..... 4.925
Youngstown U5 ..... 4.925

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy
Aliquippa,Pa. J5 ..... 5.925
Bessemer,Ala. T2 ..... 5.925
Bethlehem,Pa. B2 ..... 5.925
Clairton,Pa. U5 ..... 5.925
Cleveland R2 ..... 5.925
Ecorse,Mich. G5 ..... 6.675
Fairfield,Ala. T2 ..... 5.925
Fontana,Calif. K1 ..... 6.675
Gary,Ind. U5 ..... 5.925
Ind.Harbor,Ind. I-2 ..... 5.925
IndianaHarbor,Ind. Y1 ..... 6.425
Johnstown,Pa. B2 ..... 5.925
Lackawanna,N.Y. B2 ..... 5.925
LosAngeles B3 ..... 6.625
Pittsburgh J5 ..... 5.925
Seattle B3 ..... 6.675
So.Duquesne,Pa. U5 ..... 5.925
So.SanFrancisco B3 ..... 6.675
Struthers,O. Y1 ..... 6.425
Youngstown U5 ..... 5.925

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ..... 4.925
BeaverFalls,Pa. M12 ..... 4.975
Buffalo B5 ..... 4.975
Camden,N.J. P13 ..... 5.375
Carnegie,Pa. C12 ..... 4.925
Chicago B5 ..... 4.925
Chicago W18 ..... 4.925
Cleveland A7 ..... 4.925
Cleveland C20 ..... 4.925
Detroit P17, R7 ..... 5.075
Donora,Pa. A7 ..... 4.925
Elyria,O. W8 ..... 4.925
Franklin Park,Ill. N5 ..... 4.925
Gary,Ind. R2 ..... 4.925
GreenBay,Wis. F7 ..... 4.925
Hammond,Ind. L2,M13 ..... 4.925
Hartford,Conn. R2 ..... 5.475
LosAngeles R2 ..... 6.375
Mansfield,Mass. B5 ..... 5.475
Massillon,O. R2, R8 ..... 4.925
Monaca,Pa. S17 ..... 4.925
Newark,N.J. W18 ..... 5.375
Plymouth,Mich. P5 ..... 4.975
Pittsburgh J5 ..... 4.925
Putnam,Conn. W18 ..... 5.475
Readville,Mass. C14 ..... 5.475
St. Louis,Mo. M5 ..... 5.30
So.Chicago,Ill. W14 ..... 4.925
SpringCity,Pa. K3 ..... 5.375
Struthers,O. Y1 ..... 4.925
Waukegan,Ill. A7 ..... 4.925
Youngstown Y1 ..... 4.925
Youngstown F3 ..... 4.925

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ..... 6.00
BeaverFalls,Pa. M12 ..... 6.00
Bethlehem,Pa. B2 ..... 6.00
Buffalo B5 ..... 6.00
Camden,N.J. P13 ..... 6.40
Canton,O. R2 ..... 6.00
Canton,O. T7 ..... 5.99
Carnegie,Pa. C12 ..... 6.00
Chicago B5 ..... 6.00
Chicago W18 ..... 6.00
Cleveland A7 ..... 6.05
Cleveland C20 ..... 6.00
Detroit P17, R7 ..... 6.15
Donora,Pa. A7 ..... 6.05
Elyria,O. W8 ..... 6.00
Gary,Ind. R2 ..... 6.00
Hammond,Ind. L2, M13 ..... 6.00
Hartford,Conn. R2 ..... 6.45
Lackawanna,N.Y. B2 ..... 6.00
Mansfield,Mass. B5 ..... 6.45
Massillon,O. R2, R8 ..... 6.00
Midland,Pa. C18 ..... 5.40
Monaca,Pa. S17 ..... 6.00
Newark,N.J. W18 ..... 6.35
Plymouth,Mich. P5 ..... 6.20
Struthers,O. Y1 ..... 6.00
Warren,O. C17 ..... 6.00
Waukegan,Ill. A7 ..... 6.05
Worcester,Mass. A7 ..... 6.35
Youngstown Y1 ..... 6.00
Youngstown F3 ..... 6.00

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ..... 3.95
Atlanta A11 ..... 4.50
Buffalo R2 ..... 3.95
Cleveland R2 ..... 3.95
Emeryville,Calif. J7 ..... 4.70
Fairfield,Ala. T2 ..... 3.95
Fontana,Calif. K1 ..... 4.65
Gary,Ind. U5 ..... 3.95
Houston S6 ..... 4.45
Ind.Harbor,Ind. I-2, Y1 ..... 3.95
Johnstown,Pa. B2 ..... 3.95
Kansas City,Mo. S6 ..... 4.55
Lackawanna,N.Y. B2 ..... 3.95
LosAngeles B3 ..... 4.65
Milton,Pa. B6 ..... 4.55
Minnequa,Colo. C10 ..... 4.75
Niles,Calif. P1 ..... 4.65
Pittsburg,Calif. C11 ..... 4.65
Pittsburgh J5 ..... 3.95
SanEmeryville,Calif. S8 ..... 4.85
Seattle B3, N14 ..... 4.70
So.Chicago,Ill. R2 ..... 3.95
So.Duquesne,Pa. U5 ..... 3.95
So.SanFrancisco B3 ..... 4.70
SparrowsPoint,Md. B2 ..... 3.95
Sterling,Ill.(1) N15 ..... 4.70
Struthers,O. Y1 ..... 3.95
Torrance,Calif. C11 ..... 4.65
Youngstown R2, U5 ..... 3.95

BARS, Reinforcing (Fabricated to Consumers)
Huntington,W.Va. W7 ..... 5.50
Johnstown, ¼-1" B2 ..... 4.75
LosAngeles B3 ..... 5.45
Marion,O. P11 ..... 5.25
Seattle B3 ..... N14 ..... 5.80
So.SanFrancisco B3 ..... 5.45
SparrowsPt. ¼-1" B2 ..... 4.75
Williamsport,Pa. S19 ..... 5.10

RAIL STEEL BARS
ChicagoHts.(3,4) C2 ..... 4.75
ChicagoHts.(3,4) I-2 ..... 4.75
Franklin,Pa.(3,4) F5 ..... 4.75
FortWorth,Tex.(26) T4 ..... 5.10
Huntington,W.Va.(3) W7 ..... 5.75
Marion,O.(3,4) P11 ..... 4.75
Moline,Ill.(3) R2 ..... 4.65
Tonawanda(3,4) B12 ..... 5.00
Williamsport(3) S19 ..... 5.25
Williamsport(4) S19 ..... 5.35

BARS, Wrought Iron
(Add 4 cts. to base and extras)
Economy,Pa.(S.R.) B14 ..... 9.60
Economy,Pa.(D.R.) B14 ..... 11.90
Economy(Staybolt) B14 ..... 12.20
Mck.Rks.(Staybolt)L5 ..... 14.50
Mck.Rks.(S.R.) L5 ..... 9.60
Mck.Rks.(D.R.) L5 ..... 13.00

SHEETS, Hot-Rolled Steel
(18 gage and heavier)
AlabamaCity,Ala. R2 ..... 3.775
Ashland,Ky.(8) A10 ..... 3.775
Butler,Pa. A10 ..... 3.775
Cleveland J5, R2 ..... 3.775
Conshohocken,Pa. A3 ..... 4.175
Detroit M1 ..... 4.40
Ecorse,Mich. G5 ..... 3.975
Fairfield,Ala. T2 ..... 3.775
Fontana,Calif. K1 ..... 4.725
Gary,Ind. U5 ..... 3.775
Geneva,Utah C11 ..... 3.875
GraniteCity,Ill. G4 ..... 4.30
Ind.Harbor,Ind. I-2, Y1 ..... 3.775
Irvin,Pa. U5 ..... 3.775
Lackawanna,N.Y. B2 ..... 3.775
Munhall,Pa. U5 ..... 3.775
Niles,O. N12 ..... 5.425
Pittsburg,Calif. C11 ..... 4.475
Pittsburgh J5 ..... 3.775
Sharon,Pa. S3 ..... 4.175
So.Chicago,Ill. W14 ..... 3.775
SparrowsPoint,Md. B2 ..... 3.775
Steubenville,O. W10 ..... 3.775
Torrance,Calif. C11 ..... 4.475
Warren,O. R2 ..... 3.775
Weirton,W.Va. W6 ..... 3.775
WestLeechburg,Pa. A4 ..... 3.75
Youngstown U5, Y1 ..... 3.775

SHEETS, H.R. (19 gage)
AlabamaCity,Ala. R2 ..... 4.925
Dover,O. R1 ..... 5.825
Mansfield,O. E6 ..... 5.65
Niles,O. N12 ..... 5.675
Torrance,Calif. C11 ..... 5.575

SHEETS, H.R. (14 ga., heavier)
High-Strength Low-Alloy
Cleveland J5, R2 ..... 5.675
Conshohocken,Pa. A3 ..... 5.925
Ecorse,Mich. G5 ..... 6.225
Fairfield,Ala. T2 ..... 5.675
Fontana,Calif. K1 ..... 6.625
Gary,Ind. U5 ..... 5.675
Ind.Harbor,Ind. I-2 ..... 5.675
Ind.Harbor,Ind. Y1 ..... 6.175
Irvin,Pa. U5 ..... 5.675
Lackawanna(35) B2 ..... 5.675
Munhall U5 ..... 5.675
Pittsburgh J5 ..... 5.675
Sharon,Pa. S3 ..... 5.675
So.Chicago,Ill. U5 ..... 5.675
SparrowsPoint(36) B2 ..... 5.675
Warren,O. R2 ..... 5.675
Weirton,W.Va. W6 ..... 6.025
Youngstown U5 ..... 5.675
Youngstown Y1 ..... 6.175

SHEETS, Cold-Rolled
High-Strength Low-Alloy
Cleveland J5, R2 ..... 6.925
Ecorse,Mich. G5 ..... 7.475
Fontana,Calif. K1 ..... 7.875
Gary,Ind. U5 ..... 6.925
IndianaHarbor,Ind. Y1 ..... 7.425
IndianaHarbor,Ind. I-2 ..... 6.925
Irvin,Pa. U5 ..... 6.925
Lackawanna(37) B2 ..... 6.925
Pittsburgh J5 ..... 6.925
SparrowsPoint(38) B2 ..... 6.925
Warren,O. R2 ..... 6.925
Weirton,W.Va. W6 ..... 7.275
Youngstown Y1 ..... 7.425

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10	4.575
Cleveland,J5, R2	4.575
Ecorse,Mich. G5	4.775
Fairfield,Ala. T2	4.575
Follansbee,W.Va. F4	5.575
Fontana,Calif. K1	5.525
Gary,Ind. U5	4.575
Granite City,Ill. G4	5.275
Ind Harbor,Ind. I-2,Y1	4.575
Irvin,Pa. U5	4.575
Lackawanna,N.Y. B2	4.575
Middletown,O. A10	4.575
Pittsburg,Calif. C11	5.525
Pittsburgh J5	4.575
SparrowsPoint,Md. B2	4.575
Steubenville,O. W10	4.575
Warren,O. R2	4.575
Weirton,W.Va. W6	5.775
Youngstown Y1	4.575

SHEETS, Galv'd No. 10 Steel

Alabamacity,Ala. R2	5.075
Ashland,Ky.(8) A10	5.075
Canton,O. R2	5.075
Leipton,O. N16	5.675
Dover,O. R1	5.775
Fairfield,Ala. T2	5.075
Gary,Ind. U5	5.075
Granite City,Ill. G4	5.50
Ind Harbor,Ind. I-2	5.075
Irvin,Pa. U5	5.075
Kokomo,Ind.(13) C16	5.475
Martinsferry,O. W10	5.075
Niles,O. N12	6.275
Pittsburg,Calif. C11	5.825
SparrowsPoint,Md. B2	5.075
Steubenville,O. W10	5.075
Torrance,Calif. C11	5.825
Weirton,W.Va. W6	5.075

SHEETS, Galvanized No. 10, High-Strength Low-Alloy

Irvin,Pa. U5	7.625
SparrowsPoint(39) B2	7.775

SHEETS, Galvannealed Steel

Canton,O. R2	5.625
Irvin,Pa. U5	5.625
Kokomo,Ind.(13) C16	6.025
Niles,O. N12	6.825

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	5.325
Middletown,O. A10	5.325

SHEETS, Electro Galvanized

Cleveland,R2 (28)	5.925
Niles,O. R2 (28)	5.925
Weirton,W.Va. W6	5.775

SHEETS, Well Casing

Fontana,Calif. K1 (43)	5.10
Torrance,Calif. C11	5.275

BLUED Stock, 29 ga.

Yorkville,O. W10	7.00
Follansbee,W.Va. F4	7.10
Follansbee (23) F4	6.425

SHEETS, Enameling Iron

Ashland,Ky.(8) A10	4.925
Cleveland,R2	4.925
Gary,Ind. U5	4.925
Granite City,Ill. G4	5.625
Ind Harbor,Ind. I-2	4.925
Irvin,Pa. U5	4.925
Middletown,O. A10	4.925
Youngstown Y1	4.925

TIN PLATE, Electrolytic (Base Box)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.40	$7.65	$8.05
Fairfield,Ala. T2	7.50	7.75	8.15
Gary,Ind. U5	7.40	7.65	8.05
Granite City,Ill. G4	7.60	7.85	8.25
Indiana Harbor,Ind. I-2, Y1	7.40	7.65	8.05
Irvin,Pa. U5	7.40	7.65	8.05
Niles,O. R2	7.40	...	...
Pittsburg,Calif. C11	8.15	8.40	8.80
SparrowsPoint,Md. B2	7.50	7.75	8.15
Weirton,W.Va. W6	7.40	7.65	8.05
Yorkville,O. W10	7.40	7.65	8.05

SHEETS, SILICON, H.R. or C.R (22 Ga.) COILS (Cut lengths 1/2c lower)

	Field	Arma-ture	Elec-tric	Motor	Dyna-mo
Beech Bottom, W.Va. (cut lengths)	...	...	7.85	9.10	9.90
Brackenridge,Pa. A4	...	...	7.75	9.00	9.80
Granite City,Ill. G4 (cut lengths)	...	...	8.55	9.80	...
Indiana Harbor,Ind. I-2	7.55	7.85	(34)	(41)	...
Mansfield,O. E6 (cut lengths)	7.20	7.35	7.85	9.10	9.90
Niles,O. N12 (cut lengths)	7.60	7.85	7.85	...	...
Vandergrift,Pa. U5	...	...	7.85	8.35	9.60 10.40
Warren,O. R2	7.55	7.85	8.35	9.60	10.40
Zanesville,O. A10	...	...	7.85	8.35	9.60 10.40

SHEETS, SILICON (22 Ga. Base) COILS (Cut Lengths 1/2c lower)

Transformer Grade	72	65	58	52
Beech Bottom, W.Va. (cut lengths)	10.45	11.00	11.70	12.50
Brackenridge,Pa. A4	10.35	...	...	...
Vandergrift,Pa. U5	10.95	11.50	12.20	13.00
Warren,O. R2	10.95	...	...	...
Zanesville,O. A10	10.95	11.50	12.20	13.00

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)

	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C.R.)	...	...	15.35	15.85
Vandergrift,Pa. U5	13.50	14.35	15.35	15.85

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$6.25
Fairfield,Ala. T2	6.60
Gary,Ind. U5	6.50
Granite City,Ill. G4	6.70
Ind Harbor,Ind. I-2, Y1	6.50
Irvin,Pa. U5	6.50
Niles,O. R2	6.50
Pittsburg,Calif. C11	7.25
SparrowsPoint,Md. B2	6.60
Warren,O. R2	6.50
Weirton,W.Va. W6	6.50
Yorkville,O. W10	6.50

HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee,W.Va. F4	6.10
Gary,Ind. U5	6.10
Granite City,Ill. G4	6.30
Ind Harbor,Ind. Y1	6.10
Irvin,Pa. U5	6.10
Yorkville,O. W10	6.35

SHEETS, Culvert No. 16

	Cu Alloy	Cu Fe
Ashland,Ky. A10	5.875	...
Canton,O. R2	5.925	6.375
Fairfield,Ala. T2	5.875	6.125
Gary,Ind. U5	5.875	6.125
Ind Harbor,Ind. I-2	5.875	6.125
Irvin,Pa. U5	5.875	6.125
Kokomo,Ind. C16	6.525	...
Martinsferry,O. W10	5.875	...
Pittsburg,Calif. C11	6.625	...
SparrowsPt. B2	5.875	...
Torrance,Cal. C11	6.625	...

SHEETS, Culvert, No. 16 Pure Iron

Ashland,Ky. A10	6.125
Fairfield,Ala. T2	6.125
Martinsferry,O. W10	6.125

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10	4.025
Cleveland,R2	4.375
Ind Harbor,Ind. I-2	4.025
Warren,O. R2	4.375

SHEETS, Cold-Rolled Ingot Iron

Butler,Pa. A10	5.075
Cleveland,R2	5.175
Middletown,O. A10	5.075
Warren,O. R2	5.175

SHEETS, Galvanized Ingot Iron No. 10 flat

Ashland,Ky.(8) A10	5.325
Canton,O. R2	5.825

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10	5.575
Middletown,O. A10	5.575

SHEETS, ALUMINIZED

Butler,Pa. A10	8.425

TINPLATE, American 1.25 Coke (Base Box)

	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.70	$8.95
Fairfield,Ala. T2	8.80	9.05
Gary,Ind. U5	8.70	8.95
Ind Har. I-2, Y1	8.70	8.95
Irvin,Pa. U5	8.70	8.95
Niles,O. (41) N12	9.45	9.70
Sp Pt.,Md. B2	8.80	9.05
Warren,O. R2	8.70	...
Weirton,W.Va. W6	8.70	8.95
Yorkville,O. W10	8.70	8.95

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$7.85
Gary,Ind. U5	7.75
Irvin,Pa. U5	7.75
Yorkville,O. W10	7.75

SHEETS, LT. Coated Ternes, 6 lb (Commercial Quality)

Yorkville,O. W10	$8.65

SHEET, Mfg. Ternes, 8 lb (Commercial Quality)

Gary,Ind. U5	$9.75
Yorkville,O. W10	9.75

SHEET, Long Terne Steel (Commercial Quality)

Beech Bottom,W.Va. W10	5.475
Gary,Ind. U5	5.475
Mansfield,O. E6	6.05
Middletown,O. A10	5.475
Niles,O. N12	6.275
Weirton,W.Va. W6	5.475

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.875

ROOFING SHORT TERNES (8 lb Coated)

Gary,Ind. U5	9.75

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2	5.65
Conshohocken,Pa. A3	5.90
Ecorse,Mich. G5	6.30
Fairfield,Ala. T2	5.65
Fontana,Calif. K1	6.55
Gary,Ind. U5	5.65
Ind Harb.,Ind. I-2	5.65
Ind Harbor,Ind. Y1	6.15
Lackawanna,N.Y. B2	5.70
Los Angeles(25) B3	6.40
Seattle(25) B3	6.65
Sharon,Pa. S3	5.65
So.San Francisco(25) B3	6.40
SparrowsPoint,Md. B2	5.70
Warren,O. R2	5.65
Weirton,W.Va. W6	6.10
Youngstown Y1	6.15
Youngstown U5	5.65

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland,J5	7.45
Cleveland,A7	7.30
Dover,O. G6	8.00
Ecorse,Mich. G5	8.15
Lackawanna,N.Y. B2	7.90
Sharon,Pa. S3	7.30
SparrowsPoint,Md. B2	7.90
Warren,O. R2	7.30
Weirton,W.Va. W6	7.95
Youngstown Y1	7.80

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	3.725
Alton,Ill. L1	4.20
Ashland,Ky.(8) A10	3.725
Atlanta,Ill. ...	4.275
Bessemer,Ala. T2	3.725
Bridgeprt,Conn.(10) S15	4.225
Buffalo(27) R2	3.725
Butler,Pa. A10	3.725
Carnegie,Pa. S18	*4.225*
Conshohocken,Pa. A3	4.125
Detroit,Mi. ...	4.40
Ecorse,Mich. G5	4.025
Fairfield,Ala. T2	3.725
Fontana,Calif. K1	4.975
Gary,Ind. U5	3.725
Houston,Tex. S8	*4.125*
Ind Harbor,Ind. I-2,Y1	3.725
Johnstown,Pa.(25) B2	3.725
Kansas City,Mo. S7	4.275
Lackawanna,N.Y.(32) B2	3.725
Los Angeles(25) B3	4.475
Milton,Pa. B6	4.35
Minnequa,Colo. C10	4.775
NewBritain(10) S15	4.225
N.Tonawanda,N.Y. B11	3.725
Pittsburg,Calif. C11	4.475
Riverdale,Ill. A7	3.725
San Francisco S7	5.00
Seattle(25) B3	4.725
Seattle N14	4.75
Sharon,Pa. S3	4.225
So.Chicago,Ill. W14	3.725
So.San Francisco(25) B3	4.475
SparrowsPoint,Md. B2	3.725
Sterling,Ill. N15	4.725
Torrance,Calif. C11	4.475
Warren,O. R2	3.725
Weirton,W.Va. W6	3.825
WestLeechburg,Pa. A4	3.75
Youngstown U5, Y1	3.725

STRIP, Hot-Rolled Alloy

Bridgeprt,Conn.(10) S15	6.05
Carnegie,Pa. S18	*6.45*
Fontana,Calif. K1	7.30
Gary,Ind. U5	6.10
Houston,Tex. S8	*6.50*
Kansas city,Mo. S7	*6.70*
Midland,Pa. C18	5.85
NewBritn,Conn.(10) S15	6.05
Sharon,Pa. S3	6.45
Youngstown U5	6.10

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6	5.50
Bridgeprt,Conn.(10) S15	5.80
Butler,Pa. A10	5.10
Cleveland A7, J5	5.10
Dearborn,Mich. D3	6.05
Detroit D2	5.60
Detroit M1	5.45
Dover,O.(40) G6	5.50
Ecorse,Mich. G5	5.30
Follansbee,W.Va. F4	5.10
Fontana,Calif. K1	6.75
FranklinPark,Ill.(40) T6	5.35
Ind Harbor,Ind. I-2	5.35
Lackawanna,N.Y. B2	5.10
Los Angeles C1	6.85
Mattapan,Mass. T6	5.95

STRIP, Cold-Finished, Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Beren,O. C7	...	7.65	8.25	10.20	12.50
Bridgeport,Conn.(10) S15	5.80	7.65	8.25	10.20	12.50
Bristol,Conn. W1	...	...	8.55	10.50	...
Carnegie,Pa. S18	...	*7.65*	*8.25*	*10.20*	*12.50*
Cleveland A7	5.10	7.30	8.25	10.20	12.50
Dearborn,Mich. D3	6.05	7.90	8.50	...	...
Detroit D2	6.45	7.50	8.10	...	...
Dover,O. G6	5.70	7.65	8.25	10.20	12.50
FranklinPark,Ill. T6	5.45	7.45	8.40	10.35	12.65
Harrison,N.J. C18	...	...	7.70	9.65	11.95
Mattapan,Mass. T6	5.95	7.60	8.55	10.50	12.80
NewBritn.,Conn.(10) S15	5.80	7.65	8.25	10.20	12.50
NewCastle,Pa. B4	5.80	7.65	8.25	10.20	...
NewCastle,Pa. E2	5.80	7.65	8.25	10.20	12.50
NewHaven,Conn. D2	6.70	7.60	8.20	...	...
NewYork W3	...	7.95	8.55	10.50	12.80
Pawtucket,R.I. N8: Cleve.orPitts.Base	...	7.65	8.25	10.20	12.50
Worcester,Mass.,Base	6.30	7.95	8.55	10.50	12.80
Sharon,Pa. S3	5.80	7.65	8.25	10.20	12.50
Trenton,N.J. R5	...	7.95	8.55	10.50	12.80
Wallingford,Conn. W2	6.30	7.60	8.20	10.15	12.65
Weirton,W.Va. W6	5.80	7.65	8.25	10.20	12.50
Worcester,Mass. A7	5.40	7.60	8.55	10.50	12.80
Worcester,Mass. T6	5.95	7.60	8.55	10.50	12.80
Youngstown C8	...	7.65	8.25	10.20	12.50
Spring Steel (Tempered)					
Trenton,N.J. R5 (29)	...	...	10.30	12.50	15.35
Harrison,N.J. C18	...	...	10.30	12.50	15.35
NewYork W3	...	...	10.30*	12.50*	15.35*
Youngstown C8	...	...	10.30	12.50	15.35

* Plus $1.575 per 100 lb.

STRIP, Cold-Rolled Alloy Steel

Bridgeprt,Conn.(10) S15	12.15
Carnegie,Pa. S18	*12.00*
Cleveland A7	11.40
Dover,O. G6	11.90
Fontana,Calif. K1	13.05
Harrison,N.J. C18	10.60
Midland,Pa. C18	10.60
NewBritn.Conn.(10) S15	12.15
Pawtucket,R.I.(11) N8	12.15
Pawtucket,R.I.(12) N8	12.45
Sharon,Pa. S3	12.00
Worcester,Mass. A7	11.70
Youngstown C8	12.00

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	3.975
Warren,O. R2	4.325

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	5.70

TIGHT COOPERAGE HOOP

Atlanta,Ill. ...	4.45
Riverdale,Ill. A1	4.30
Sharon,Pa. S3	4.55
Youngstown U5	4.15

Middletown,O. A10	5.10
NewBritain(10) S15	5.80
New Castle,Pa. B4	5.80
NewCastle,Pa.(40) E5	5.70
NewHaven,Conn. D2	5.85
NewHaven,Conn. A7	5.60
Pawtucket,R.I. R3	6.45
Pawtucket,R.I.(21) N8	5.30
Riverdale,Ill.(40) A1	5.35
Rome,N.Y. R6	5.10
Sharon,Pa. S3	5.80
SparrowsPoint,Md. B2	5.10
Trenton,N.J. R5	6.45
Wallingford,Conn. W2	6.30
Warren,O.(40) T5	5.25
Warren,O. R2	5.10
Weirton,W.Va. W6	5.10
Youngstown C8 (40)	5.70
Youngstown Y1	5.10

STRIP, Electro Galvanized

Dover,O. G6	5.50
Warren,O. T5	5.25
Weirton,W.Va. W6	5.10
Youngstown C8	5.70

STRIP, Cold-Rolled Alloy Steel

Bridgeprt,Conn.(10) S15	12.15
Carnegie,Pa. S18	*12.00*
Cleveland A7	11.40
Dover,O. G6	11.90
Fontana,Calif. K1	13.05
Harrison,N.J. C18	10.60
Midland,Pa. C18	10.60
NewBritn.Conn.(10) S15	12.15
Pawtucket,R.I.(11) N8	12.15
Pawtucket,R.I.(12) N8	12.45
Sharon,Pa. S3	12.00
Worcester,Mass. A7	11.70
Youngstown C8	12.00

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	3.975
Warren,O. R2	4.325

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	5.70

TIGHT COOPERAGE HOOP

Atlanta,Ill. ...	4.45
Riverdale,Ill. A1	4.30
Sharon,Pa. S3	4.55
Youngstown U5	4.15

Key to Producers

A1	Acme Steel Co.	C10	Colorado Fuel & Iron
A3	Alan Wood Steel Co.	C11	Columbia-Geneva Steel
A4	Allegheny Ludlum Steel	C12	Columbia Steel & Shaft
A7	American Steel & Wire	C13	Columbia Tool Steel Co.
A8	Anchor Drawn Steel Co.	C14	Compressed Steel Shaft
A9	Angell Nail & Chaplet	C16	Continental Steel Corp.
A10	Armco Steel Corp.	C17	Copperweld Steel Co.
A11	Atlantic Steel Co.	C18	Crucible Steel Co.
A13	American Cladmetals Co.	C19	Cumberland Steel Co.
B1	Babcock & Wilcox Co.	C20	Cuyahoga Steel & Wire
B2	Bethlehem Steel Co.	C22	Claymont Steel Corp.
B3	Bethlehem Coast Steel	D2	Detroit Steel Corp.
B4	Blair Strip Steel Co.	D3	Detroit Tube & Steel
B5	Bliss & Laughlin Inc.	D4	Disston & Sons, Henry
B6	Bolardi Steel Corp.	D6	Driver Harris Co.
B8	Braeburn Alloy Steel	D7	Dickson Weatherproof Nail, Co.
B11	Buffalo Bolt Co.	E1	Eastern Gas&Fuel Assoc.
B12	Buffalo Steel Div., H.K. Porter Co.	E2	Eastern Stainless Steel
B14	A. M. Byers Co.	E4	Electro Metallurgical Co.
C1	Calstrip Steel Corp.	E5	Elliott Bros. Steel Co.
C2	Calumet Steel Div. Borg-Warner, Corp.	E6	Empire Steel Corp.
C4	Carpenter Steel Co.	F2	Firth Sterling Inc.
C5	Central Iron & Steel Div. Barium Steel Corp.	F3	Fitzsimons Steel Co.
C7	Cleve. Cold Rolling Mills	F4	Follansbee Steel Corp.
C8	Cold Metal Products Co.	F5	Franklin Steel Div. Borg-Warner Corp.
C9	Colonial Steel Co.	F6	Fretz-Moon Tube Co.
		F7	Ft. Howard Steel & Wire
		G2	Globe Iron Co.
		G3	Globe Steel Tubes Co.
		G4	Granite City Steel Co.
		G5	Great Lakes Steel Corp.
		G6	Greer Steel Co.
		H1	Hanna Furnace Corp.
		I-1	Igoe Bros. Inc.
		I-2	Inland Steel Co.
		I-3	Interlake Iron Corp.
		I-4	Ingersoll Steel Div. Borg-Warner Corp.
		I-7	Indiana Steel & Wire Co.
		J1	Jackson Iron & Steel Co.
		J3	Jessop Steel Co.
		J4	Johnson Steel & Wire Co.
		J5	Jones & Laughlin Steel
		J6	Joslyn Mfg. & Supply
		J7	Judson Steel Corp.
		J8	Jersey Shore Steel Co.
		K1	Kaiser Steel Corp.
		K2	Keokuk Electro Metals
		K3	Keystone Drawn Steel
		K4	Keystone Steel & Wire
		L1	Laclede Steel Co.
		L2	LaSalle Steel Co.
		L3	Latrobe Steel Co.
		L5	Lockhart Iron & Steel
		L6	Lone Star Steel Co.
		L7	Lukens Steel Co.

WIRE, Merchant Quality

(6 to 8 gage)	An'ld.	Galv.
AlabamaCity,R2	.6.075	6.325
Aliquippa,J5	.6.075	6.45*
Atlanta,A11	.6.325	6.675
Bartonville(19)	K4 6.075	6.45
Buffalo,W12	5.225	
Cleveland,A7	.6.075	6.225
Crawfordsville,MS	6.175	6.55
Donora,Pa.,A7	.6.075	6.225
Duluth,Minn.,A7	.6.075	6.225
Fairfield,T2	.6.075	6.225
Houston,Tex.,S5	*6.475*	*6.625*
Johnstown,B2	.6.075	6.45*
Joliet,Ill.,A7	.6.075	6.225
Kansas City,Mo.,S5	*6.625*	*6.85*
Kokomo,C16	.6.175	6.425
LosAngeles,B3	7.025	
Minnequa,C10	.6.325	6.70*
Monessen,P7	5.95	6.40
Palmer,W12	5.525	
Pitts.,Calif.,C11	7.025	7.175
Prtsmth.(18)P12	6.475	
Rankin,A7	.6.075	6.225
So.Chicago,R2	.6.075	6.325
So.S.Fran.,C10	.7.025	7.40*
SparrowsPt.,B2	.6.175	6.55*
Sterling,Ill.(1)N15	6.075	6.45
Struthers,O.,Y1	.6.075	6.475
Torrance,Cal.,C11	7.025	
Worcester,A7	.6.375	6.525

*Based on 14-cent zinc. †14.50-cent zinc.

ROPE WIRE (A)

Alton,Ill.,L1	9.15
Bartonville,Ill.,K4	8.95
Buffalo,W12 (43)	8.55
Fostoria,O.,S1 (43)	8.55
Johnstown,Pa.,B2 (43)	8.55
Monessen,Pa.,P16 (43)	8.55
Monessen,Pa.,P7 (43)	8.80
Muncie,Ind.,I-7 (43)	8.75
Palmer,Mass.,W12 (43)	8.85
Portsmouth,O.,P12 (43)	8.55
Roebling,N.J.,R5 (43)	8.85
SparrowsPt.,B2 (43)	8.65
Struthers,O.,Y1 (43)	8.55
Worcester,J4,T6 (43)	8.85

(A) Plow and Mild Plow: add 0.25c for improved plow.

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala.,R2	5.225
Aliquippa,Pa.,J5 (42)	4.85
Atlanta,A11	5.475
Alton,Ill.,L1	5.45
Bartonville,Ill.,K4	5.325
Buffalo,W12	5.225
Chicago,W13	5.475
Cleveland,A7,C20	5.225
Crawfordsville,Ind.,MS	5.325
Donora,Pa.,A7	5.225
Duluth,Minn.,A7	5.225
Fairfield,Ala.,T2	5.225
Fostoria,O.(24)	S1 5.725
Houston,S5	*5.625*
Johnstown,Pa.,B2	5.225
Joliet,Ill.,A7	5.225
Kansas City,Mo.,S5	*5.875*
Kokomo,Ind.,C16	5.325
LosAngeles,B3	6.175
Minnequa,Colo.,C10	5.475
Monessen,Pa.,P7	5.10
Newark,6-8 ga.,I-1	5.88
No.Tonawanda,B11	5.225
Palmer,Mass.,W12	5.525
Pittsburg,Calif.,C11	6.175
Portsmouth,O.,P12	5.625
Rankin,Pa.,A7	5.225
So.Chicago,Ill.,R2	5.225
So.SanFrancisco,C10	6.175
SparrowsPoint,Md.,B2	5.325
Sterling,Ill.(1),N15	5.225
Struthers,O.,Y1	5.225
Torrance,Calif.,C11	7.025
Worcester,Mass.,A7	5.525

WIRE, Cold-Rolled Flat

Anderson,Ind.,G6	6.20
Buffalo,W12 (43)	6.35
Cleveland,A7 (43)	5.85
Crawfordsville,Ind.,MS(43)	5.85
Dover,O.,R1 (42)	6.20
Fostoria,O.,S1 (43)	6.00
Kokomo,Ind.,C16 (43)	5.70
FranklinPark,Ill.,T6(43)	6.20
Massillon,O.,R8 (43)	5.85
Monessen,Pa.,P16 (43)	6.35
Monessen,Pa.,P7	6.10
Pawtkt,R.I.(12),NS (43)	6.85
Trenton,N.J.,R5 (43)	6.15
Worcester,Mass.,A7(43)	6.15
Worcester,Mass.,T6(43)	6.50
Worcester,Mass.W12 (43)	6.65

WIRE, Galv'd ACSR for Cores

Bartonville,Ill.,K4	8.00
Monessen,Pa.,P16 (43)	8.50
Muncie,Ind.,I-7 (43)	8.70
Roebling,N.J.,R5 (43)	8.80
SparrowsPt.,Md.,B2 (43)	8.60
Johnstown,Pa.,B2 (43)	8.50

WIRE (16 gage)

Stone	An'ld. Stone	Galv. Stone
(Add 4.7% on base and extras)		
Aliquippa,J5	10.15	12.15
Bartonville(19),K4	10.25	12.00*
Cleveland,A7	10.25	11.55
Crawfordsville,MS	10.25	12.00
Fostoria,O.,S1	10.40	13.00
Johnstown,B2	10.73	12.58‖
Kokomo,C16	10.625†	12.325†
Minnequa,C10	10.40	12.425*
Palmer,Mass.,W12	10.25	12.15
Pitts.,Cal.,C11	10.60	11.90
SparrowsPt.,B2	10.54	12.68‖
Waukegan,A7	10.25	11.55
Worcester,A7		11.85

*Based on 14-cent; ‖14.50 cent zinc. †Includes 4.7% increase.

WIRE, MB Spring, High Carbon

Aliquippa,Pa.,J5 (43)	6.25
Alton,Ill.,L1	6.85
Bartonville,Ill.,K4	6.64
Buffalo,W12 (43)	6.25
Cleveland,A7 (43)	6.25
Donora,Pa.,A7 (43)	6.25
Duluth,Minn.,A7 (43)	6.25
Fostoria,O.,S1 (43)	6.25
Johnstown,Pa.,B2 (43)	6.25
Millbury(12),N6 (43)	8.05
Minnequa,Colo.,C10 (43)	6.50
Monessen,Pa.,P7 (43)	6.25
Monessen,Pa.,P16	6.75
Muncie,Ind.,I-7 (43)	6.45
Palmer,Mass.,W12 (43)	6.55
Pittsburg,Calif.,C11 (43)	7.20
Roebling,N.J.,R5 (43)	6.55
Portsmouth,O.,P12 (43)	6.25
So.Chicago,Ill.,R2 (43)	6.25
So.SanFran.,C10 (43)	7.20
SparrowsPt.,Md.,B2 (43)	6.35
Struthers,O.,Y1 (43)	6.25
Trenton,N.J.,A7 (43)	6.55
Waukegan,Ill.,A7 (43)	6.25
Worcester,A7,T6 (43)	6.55
Worcester,Mass.,W12 (43)	6.55
Worcester,Mass.,J4 (43)	6.75

WIRE, Tire Bead

Bartonville,Ill.,K4	11.51
Monessen,Pa.,P16 (43)	11.40
Roebling,N.J.,R5 (43)	11.55

WIRE, Fine & Weaving (8"Coils)

Bartonville,Ill.,K4	9.42
Buffalo,W12 (43)	8.90
Chicago,W13	9.32
Cleveland,A7 (43)	8.90
Crawfordsville,Ind.,MS(43)	8.90
Fostoria,O.,S1 (43)	8.90
Johnstown,Pa.,B2 (43)	8.90
Kokomo,Ind.,C16 (43)	8.90
Monessen,Pa.,P16 (43)	8.90
Muncie,Ind.,I-7 (43)	9.10
Palmer,Mass.,W12 (43)	9.20
Roebling,N.J.,R5 (43)	9.20
Waukegan,Ill.,A7 (43)	8.90
Worcstr,Mass.,A7,T6(43)	9.20

WIRE, Barbed

	Col.
AlabamaCity,Ala.,R2	144
Aliquippa,Pa.,J5	147*
Atlanta,A11	149
Bartonville,Ill.(19),K4	147
Crawfordsville,Ind.,MS	149
Donora,Pa.,A7	142
Duluth,Minn.,A7	142
Fairfield,Ala.,T2	142
Houston,Tex.,S5	*150*
Johnstown,Pa.,B2	147
Joliet,Ill.,A7	142
Kansas City,Mo.,S5	*154*
Kokomo,Ind.,C16	149
Minnequa,Colo.,C10	153*
Monessen,Pa.,P7	146
Pittsburg,Calif.,C11	162
Rankin,Pa.,A7	142
So.Chicago,Ill.,R2	144
So.SanFran.,Calif.,C10	167*
SparrowsPoint,Md.,B2	149
Sterling,Ill.(1),N15	147

*Based on 14-cent zinc

WIRE, Upholstery Spring

Aliquippa,Pa.,J5	6.275
Alton,Ill.,L1	6.50
Buffalo,W12	6.275
Cleveland,A7	6.275
Donora,Pa.,A7	6.275
Duluth,Minn.,A7	6.275
Johnstown,Pa.,B2	6.275
Los Angeles,B3	7.225
Minnequa,Colo.,C10	6.525
Monessen,Pa.,P7	5.90
Monessen,Pa.,P16(42)	6.40
NewHaven,Conn.,A7	6.575
Palmer,Mass.,W12	6.575
Pittsburg,Calif.,C11	7.225
Portsmouth,O.,P12	6.275
Roebling,N.J.,R5	6.575
So.Chicago,Ill.,R2	6.275
So.SanFrancisco,C10	7.225
SparrowsPoint,Md.,B2	6.375
Torrance,Calif.,C11	7.225
Trenton,N.J.,A7	6.575
Waukegan,Ill.,A7	6.275
Worcester,Mass.,A7	6.575

WOVEN FENCE,9-15½ Ga. Col.

AlabamaCity,Ala.,R2	135
Ala.City,Ala.,17-18ga,R2	222
Aliquippa,Pa.,9-14½ga,J5	131
Atlanta,A11	140
Bartonville,Ill.(19),K4	138
Crawfordsville,Ind.,MS	140
Donora,Pa.,A7	133
Duluth,Minn.,A7	135
Fairfield,Ala.,T2	133
Houston,Tex.,S5	*141*
Johnstown,Pa.,B2	138
Johnstown,17ga.,6" B2	229
Joliet,Ill.,A7	133
Kansas City,Mo.,S5	*145*
Kokomo,Ind.,C16	140
Minnequa,Colo.,C10	146*
Monessen,Pa.,P7	136
Pittsburg,Calif.,C11	156
Rankin,Pa.,A7	133
So.Chicago,Ill.,R2	135
Sterling,Ill.(1),N15	138

*Based on 14-cent zinc

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala.,R2	132
Atlanta,A11	135
Bartonville,Ill.(19),K4	132
Crawfordsville,Ind.,MS	134
Donora,Pa.,A7	132
Duluth,Minn.,A7	132
Fairfield,Ala.,T2	132
Joliet,Ill.,A7	132
Kansas City,Mo.,S5	*144*
Kokomo,Ind.,C16	134
Minnequa,Colo.,C10	137
Pittsburg,Calif.,C11	156
So.Chicago,Ill.,R2	132
So.SanFran.,Calif.,C10	156
SparrowsPoint,Md.,B2	134
Sterling,Ill.(1),N15	132

FENCE POSTS

Chicago(18),Ill.,C2	140
Duluth,Minn.,A7	133
Franklin,Pa.,F3	140
Huntington,W.Va.,W7	148
Johnstown,Pa.,B2	148
Marion,O.,P11	140
Minnequa,Colo.,C10	138
Moline,Ill.,R2	136
So.Chicago,Ill.,R2	140
Tonawanda,N.Y.,B12	148
Williamsport,Pa.,S19	158

TRACK BOLTS (20) Treated

KansasCity,Mo.,S5	9.85
Lebanon,Pa.(3),B2	9.85
Minnequa,Colo.,C10	9.85
Pittsburgh,O3,P14	9.85

AXLES

Ind.Harbor,Ind.,S13	5.65
Johnstown,Pa.,B2	5.65

NAILS, Stock

To dealers & mfrs. (7)	Col.
AlabamaCity,Ala.,R2 (44)	118
Aliquippa,Pa.,J5 (44)	118
Atlanta,A11	130
Bartonville,Ill.(19),K4	127
Chicago,Ill,W13 (44)	118
Cleveland,A9 (44)	125
Crawfordsville,Ind.,MS	130
Donora,Pa.,A7 (44)	118
Duluth,Minn.,A7 (44)	118
Fairfield,Ala.,T2 (44)	118
Galveston,Tex.,D7(44)	126
Houston,Tex.,S5	*126*
Johnstown,Pa.,B2 (44)	118
Joliet,Ill.,A7 (44)	118
Kansas City,Mo.,S5	*140*
Kokomo,Ind.,C16	129
Minnequa,Colo.,C10 (44)	123
Monessen,Pa.,P7	124
Pittsburg,Calif.,C11 (44)	137

RAILS

Bessemer,Pa.,U5	
Ensley,Ala.,T2	
Fairfield,Ala.,T2	
Gary,Ind.,U5	
Huntington,W.Va.,W7	
IndianaHarbor,Ind.,I-2	
Johnstown,Pa.,B2	
Lackawanna,N.Y.,B2	
Minnequa,Colo.,C10	
Steelton,Pa.,B2	
Williamsport,Pa.,S19	

* Per net ton.

TOOL STEEL

(Prices subject to 4.7% increase)

Grade	$ per lb
Regular Carbon	0.230
Extra Carbon	0.270
Special Carbon	0.325
Oil Hardening	0.350
5% Cr Hot Work	0.350
Hi-Carbon-Cr	0.635

Grade by Analysis

W	Cr	V	Co	
18	4	1	.....	1.505
18	4	2	.....	1.65-1.66
20-25	4-25	1.6-2	12-25	3.535-3.675
19	4	2	7	2.460
18-25	4-25	1	4-75	2.125
18	4	2	9	2.445-2.45
13-5	4	3	.....	1.6025
9	3.25	0.5	.....	1.01

W	Cr	V	Mo	
6-4	4-5	1-9	5	0.96-0.965
6	4	3	6	1.190
1.5	4	1	8.5	0.810

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, M8, U4, V2 and V3.

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 18 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.50c for 17 Ga. & heavier.
(15) ¼" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25c off for untreated.
(21) New Haven, Conn., base.
(22) Del. San Francisco Bay area.
(23) 20 Ga. 36" wide.
(24) Deduct 0.20c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing, mill lengths, to fabricators; to consumers, 5.85c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Add $31.50 per ton.
(30) Sheared; add 0.35c for universal mill.
(31) Net annealed.
(32) Rd. or square edge.
(33) To jobbers, deduct 20c.
(34) † 85c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 15 gage & lighter; 60" & narrower.
(38) 14 gage & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Plus 0.375c per 100 lb.
(43) Plus 4.7% on base and extras.
(44) Plus 45c per 100 lb.
(45) Plus 40c per 100 lb.

Key to Producers

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.

N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 NewEng-HighCarb Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Div.
N14 Nrthwst. Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Sheridan Steel Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield S.&I. Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S24 Seidelhuber Steel

T2 Tenn. Coal & Iron Div.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.

U4 Universal Cyclops Steel
U5 United States Steel Co.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

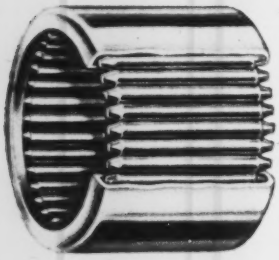
W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Wallbank Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

Sheet Prices, Page 134

	Std. No. 1	Std. No. 2	Std. All or No. 2	Sht. Tea Rails 60 lb Under
	3.775	3.675	3.725	4.25
	3.775	3.675		4.25
				4.25
	3.775	3.675	3.725	
				5.25
	3.775	3.675	3.725	
				(16)4.25
	3.775	3.675		4.25
	$75.50*	$73.50*		4.75
	3.775	3.675		
				5.00

easy mounting...



Torrington Needle Bearings are easy to mount. Installation is a simple arbor press operation. Assembly time and expenses are reduced.

You can forget about spacers, retainers and positioning shoulders, too. They are not needed with Needle Bearings. A straight bore, of proper size, serves as the housing. Thus, design is simplified and machining time is saved.

Would you like to know more about Torrington Needle Bearings in terms of your own anti-friction requirements? Our engineering department will be glad to help.

THE TORRINGTON COMPANY

Torrington, Conn. South Bend 21, Ind.

District Offices and Distributors in Principal Cities of United States and Canada

TORRINGTON NEEDLE BEARINGS

Needle • Spherical Roller • Tapered Roller • Straight Roller • Ball • Needle Rollers

BUTTWELD STANDARD PIPE, T & C

Carload discounts from list, %

Buttweld Size—Inches	⅛		¼		⅜		½		¾		1		1¼		1½		2		2½		3	
List Per Ft	8.5c		11.5c		17c		23c		27.5c		37c		58.5c		76.5c							
Pounds Per Ft	0.85		1.13		1.68		2.28		2.73		3.68		5.82		7.62							
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Alton, Ill., L1	29.5	10.5	32.5	14.5	35	18	35.5	18.5	36	19.5	36.5	20	37	20.5	37	20.5						
Benwood, W. Va., W10	32.5	13.25	35.5	17.25	38	20.75	38.5	20.5	39	21.5	39.5	22	40	21.75	40	21.75						
Etna, Pa., N2 (c)	32.5	13.25	35.5	17.25	38	20.75	38.5	20.5	39	21.5	39.5	22	40	21.75	40	21.75						
Fontana, Calif., K1 (c)	24	1.75	24	5.75	26.5	9.25	27	9	27.5	10	28	10.5	28.5	10.25	28.5	10.25						
Ind. Harbor, Ind., Y1 (c)	31.5	12.25	34.5	16.25	37	19.75	37.5	19.5	38	20.5	38.5	21	39	20.75	39	20.75						
Lorain, O., N3 (c)	32.5	13.25	35.5	17.25	38	20.75	38.5	20.5	39	21.5	39.5	22	40	21.75	40	21.75						
Pittsburgh, J5	30.75		33.75		36.25		36.75		37.25		37.75		41.5		41.5							
Sharon, Pa., M6 (c)	32.5	12.25	35.5	16.25	38	19.25	38.5	19	39	19.5	39.5	20	40	19.75	40	19.75						
Sparrows Pt., Md., B2	30.5	11.25	33.5	15.25	36	18.75	36.5	18.5	37	19.5	37.5	20	38	19.75	38	19.75						
Youngstown, R2 (c)	32.5	13.25	35.5	17.25	38	20.75	38.5	20.5	39	21.5	39.5	22	40	21.75	40	21.75						
Youngstown, Y1 (c)	32.5	13.25	35.5	17.25	38	20.75	38.5	20.5	39	21.5	39.5	22	40	21.75	40	21.75						
Wheatland, Pa., W9	32.5	13.25	35.5	16.25	38	18.75	38.5	18	39	19.5	39.5	20	40	20.25	40	20.25						

SEAMLESS STANDARD PIPE, T & C

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa., J5	24	6	27	8.25	27	8.25	29	10.25	29	10.25	33.75	15	33.75	15
Ambridge, Pa., N2	24	6	27	8.25	27	8.25	29	10.25	29	10.25	33.75	15	33.75	15
Lorain, O., N3	24	6	27	8.25	27	8.25	29	10.25	29	10.25	33.75	15	33.75	15
Youngstown Y1	24	6	27	8.25	27	8.25	29	10.25	29	10.25	33.75	15	33.75	15

ELECTRIC WELD STANDARD PIPE, T & C

Youngstown, R2	24	6	27	8.25	27	8.25	29	10.25	29	10.25	33.75	15	33.75	15

BUTTWELD STANDARD PIPE, T & C

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1	
List Per Ft	5.5c		6c		6c		9.2c		$1.09		To see	
Pounds Per Ft	0.24		0.42		0.57		9.20		To see			
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv		
Benwood, W. Va., W10	20.5	10.25	23.25	3.5	17.75	7.75	33	14.25	33	14.25		
Butler, Pa., F6 (c)	30.5	1.25	25	1.75	20	5.5						
Etna, Pa., N2 (c)	30.5	1.25	25	1.75	20	5.5	33	14.25	33	14.25		
Sharon, Pa., M6 (c)	29.5	0.25	23	4.25	18	8.25						
Sparrows Pt., Md., B2	28.5	0.75	23	3.75	18	7.50						
Youngstown R2 (c)							33	14.25	33	14.25		
Wheatland, Pa., W9	28.5	0.75	23	3.75	18	7.50						

BOILER TUBES

Net base c.l. prices, dollars per 100 ft., mill; minimum wall thickness; cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	14.19	16.71-17.37	16.20	16.20
1¼	13	16.97	19.80-20.79	16.46	19.19
1½	13	18.22-18.77	22.08-22.31	18.19	21.41
1¾	13	20.35-21.35	24.92-25.12	20.69	24.35
2	13	22.51-23.93	27.94-28.14	23.19	27.28
2¼	13	25.69-26.66	31.38-31.46	25.84	30.42
2½	12	28.40-29.36	34.55-34.78	28.46	33.50
2¾	12	31.28-32.17	37.83-38.31	31.19	36.67
2¾	12	33.87-34.99	40.99-41.49	33.05	38.86
3	12	35.78	42.11-43.93	34.98	40.82

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants; per cent off list for less than case lots to consumers)

6 in. and shorter:

½-in. & smaller diam.	15
⅝-in. & ⅝-in.	18.5
¾-in. and larger	17.5
Longer than 6 in.:	
All diams.	14
Lag bolts, all diams.:	
6 in. and shorter	23
over 6 in. long	21
Ribbed Necked Carriage	18.5
Blank	34
Plow	34
Step, Elevator, Tap and Sleigh Shoe	21
Tire bolts	21
Boiler & Fitting-Up Bolts	31

NUTS

	Reg.	Hvy.
H.P. & C.P. Square:		
½-in. & smaller	15	15
⅝-in. & ⅝-in.	12	6.5
¾-in.-1 ½-in.	9	1
1⅝-in. & larger	7.5	1
H.P. Hex.:		
½-in. & smaller	26	22
⅝-in. & ⅝-in.	16.5	6.5
¾-in.-1½-in.	12	2
1⅝-in. & larger	8.5	2
C.P. Hex.:		
½-in. & smaller	26	22
⅝-in. & ⅝-in.	23	17.5
¾-in. & 1½-in.	19.5	12
1⅝-in. & larger	12	6.5

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or keg quantities)

	Reg.	Hvy.
½-in. & smaller	35	28.5
⅝-in. & ⅝-in.	29.5	22
¾-in.-1½-in.	24	15
1⅝-in. & larger	13	8.5
	Light	
½-in. & smaller	35	
⅝-in. to ⅝-in.	28.5	
¾-in. to 1½-in.	26	

STEEL STOVE BOLTS

(F.o.b. plant, per cent off list in packages)

Plain finish	48 & 10
Plated finishes	31 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:

⅝-in. & smaller	42
⅞-in. through 1 in.	34
Longer than 6 in.:	
⅝-in. & smaller	26
⅞-in. through 1 in.	4

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam x 6 in. and shorter	38
1 in. and smaller diam. x over 6 in.	26

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	35
¼-in. diam. & larger	16
N.F. thread, all diams.	10

RIVETS

F.o.b. midwestern plants

Structural ½-in., larger	7.85c
⅞-in. under	36 off

ELECTRODES

(Threaded, with nipples, unboxed f.o.b. plant)

GRAPHITE

Inches Diam.	Length	Cents per lb
17.18-20	60-72	17.85
8 to 16	48-60-72	17.85
7	48-60	19.57
6	48-60	20.95

CARBON

35-40	110	8.03
30	65-84-110	8.03
24	72 to 104	8.03
17 to 20	34-90	8.03

METALLURGICAL COKE

Price net ton

BEEHIVE OVENS

Connellsvill.fur.	$14.50-15.00
Connellsvill.fdy.	16.50-17.50
New River foundry	20.80
Wise county, foundry	15.95
Wise county, furnace	15.20

OVEN FOUNDRY COKE

Kearney, N. J., ovens	$22.75
Everett, Mass., ovens	
New England, del.	*24.80
Chicago ovens	23.00
Chicago, del.	24.50
Terre Haute, ovens	22.50
Milwaukee, ovens	23.75
Indianapolis, ovens	22.75
Chicago, del.	26.62
Cincinnati, del.	25.85
Detroit, del.	27.05
Ironton, O., ovens	22.50
Cincinnati, del.	25.12
Painesville, O., ovens	24.00
Cleveland, del.	25.82
Erie, Pa., ovens	23.50
Birmingham, ovens	20.30
Cincinnati, del.	25.23
LoneStar, Tex., ovens	18.00
Philadelphia, ovens	22.70
Nevillelsland, Pa., ovens	23.00
Swedeland, Pa., ovens	22.60
St. Louis, ovens	
St. Louis, del.	25.40
Portsmouth, O., ovens	22.50
Cincinnati, del.	25.12
Detroit, ovens	24.00
Detroit, del.	27.00
Buffalo, del.	26.58
Flint, del.	26.73
Pontiac, del.	25.56
Saginaw, del.	27.08

*Or within $4.55 freight zone from works.

COAL, CHEMICALS

Spot, cents per gallon, ovens	
Pure benzol	30.00-35.00
Toluol, one deg.	26.00-33.00
Industrial xylol	25.00-33.50
Per ton bulk ovens	
Sulphate of ammonia	$32-$45

Cents per pound, ovens

Phenol, 40 c/carlots, non-returnable drums	17.25

FLUORSPAR

Metallurgical grade, f.o.b. shipping point, in Ill.-Ky., net tons, carloads, effective

CaF$_2$ content 70%, $43; 60%, $40.

Imported, net ton, duty paid, metallurgical grade, $33-$35.

WASHERS, WROUGHT

F.o.b. shipping point to jobbers—List to list-plus-$1

STAINLESS STEEL

(Add 4.7% on base price and extras)

Type	Sheets	C.R. Strip	Bars Wire Structurals
301	41.00	34.00	31.25
302	41.25	36.75	31.50
303	43.25	40.25	34.00
304	43.25	38.75	33.00
309	56.00	55.00	44.75
316	57.00	59.00	49.25
321	49.25	48.25	37.00
347	53.75	52.25	41.50
410	36.50	30.50	25.75
416	37.00	37.00	26.25
420	44.00	47.00	31.25
430	39.00	31.00	26.25
501	27.50	26.00	14.25
502	28.50	27.00	15.25

Bait., Types 301-347 and 430 sheets, except 303 and 309 E2.

Brackenridge, Pa., sheets A4 quotes slight variations on Types 301-347.

Bridgeville, Pa., bars, wire, sheets & strip U4.

Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502, A10.

Carnegie, Pa., sheets and strip except Types 303, 416, 501 & 502 S18.

Cleveland, strip A7.

Detroit, strip M1 quotes 34.00c on Type 301; 36.50c, 302; 38.50c, 304; 58.50c, 316; 32.00c, 347; 30.50c, 410; 31.00c, 430.

Dunkirk, N. Y., bars, wire A4 quotes slight variations on Types 301-347.

Duquesne, Pa., bars U5.

Fort Wayne, Ind., bars and wire, except Types 501 & 502 J6 quotes slight variations on Types 301-347.

Gary, Ind., sheets except Type 416 U5.

Harrison, N. J., strip and wire C18.

Massillon, O., all items, R2.

McKeesport, Pa., strip, Type 410; bars & wire, Types 410 through 430 and 31.25c on Type 302, 33.75c on 303, 32.75c on 304, 48.75c on 316, 36.75c on 321, 41.25c on 347 F2.

McKeesport, Pa., bars, sheets except Type 416 U5.

Middletown, O., sheets and strip except Types 303, 416, 420, 501 and 502 A10.

Midland, sheets & strip C18.

Munhall, Pa., bars U5.

Muncie, Ind., wire I-7 quotes types 302, 304, 430.

Pittsburgh, sheets C18.

Reading, Pa., strip except 34.25c on Type 301 and 56.00c on 309; bars except 31.50c on Type 301 and 45.25c on 309 C4.

Sharon, Pa., strip, except Types 303, 309, 416, 501, 502 and 34.25c on Type 301 S3.

So. Chicago, Ill., bars & structurals U5.

Syracuse, N. Y., bars, wire & structurals C18.

Titusville, Pa., bars U4.

Wallingford, Conn., strip W2 quotes 0.25c higher.

Washington, Pa., bars, sheets & strip, except 0.25c higher on Type 301 J3.

Washington, Pa., Types 301 through 347 sheets & strip except 303, 309; 316 sheets 62.00c, strip 64.00c W4.

Watervliet, N. Y., structurals & bars A4 quotes variations on Types 301-347.

Waukegan, bars & wire A7.

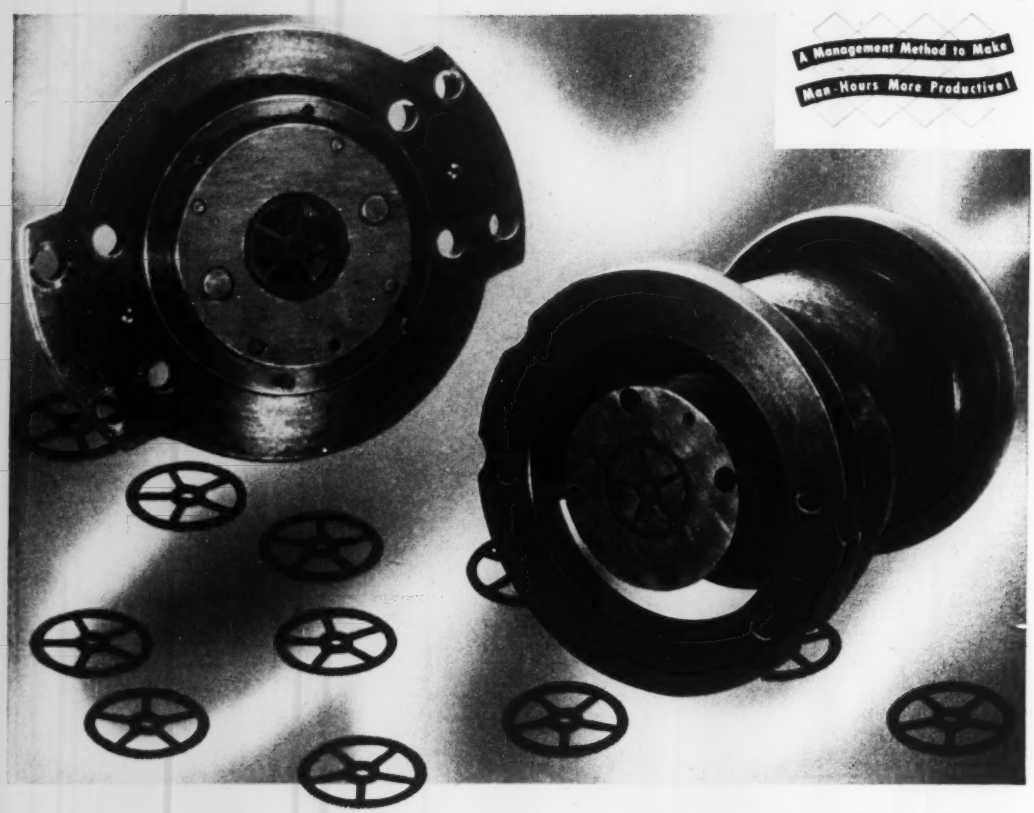
West Leechburg, Pa., strip, A4 quotes slight variations on Types 301-347.

Youngstown, strip except Types 303, 309, 316, 416, 501 and 502 and 34.25c on Type 301 C8.

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

Sponge iron:	Cents
98+% Fe, annealed	18.00
Unannealed	14.50
Swedish, c.l.f. New York, in bags	$ 85-9.95
Electrolytic iron:	
Annealed, 99.5% Fe	42.50
Unannealed (99 + % Fe)	38.50
Unannealed, 99 + % Fe (minus 325 mesh)	53.50
Powder Flakes	48.50
Carbonyl Iron: 97.9-99.8% size 5 to 10 microns	$3.00-148.00
Aluminum:	
Carlots, freight allowed	31.00
Atomized, 500 lb drums, freight allowed	33.00
Antimony, 500 lb lots	71.00
Brass, 20-ton lots	28.25-32.00
Bronze, 10-ton lots	51.25-60.00
Phosphor-Copper, 20-ton lots	50.00
Copper:	
Electrolytic	37.25
Reduced	34.75
Lead	22.50
Magnesium	75.00-85.00
Manganese:	
Minus 100 mesh	57.00
Minus 35 mesh	52.00
Minus 200 mesh	62.00
Nickel unannealed	86.00
Nickel-Silver 5-ton lots	44.50
Silicon	38.50
Solder (plus cost of metal)	8.50
Stainless Steel, 302	83.00
Zinc, 10-ton lots	20.00-28.00
Tungsten	Dollars
Melting grade, 99% 60 to 200 mesh:	
1000 lb and over	5.85
Less than 1000 lb	6.00
Molybdenum: 99.9% minus 200 mesh	3.24
Chromium, electrolytic 99% Cr min.	3.50



A Management Method to Make Man-Hours More Productive!

Why Not Gear Up For Today's Production *This* Way?

For 11 years this Stentor blanking die and punch gave trouble-free performance, averaging 100,000 gears per grind. This record enabled management and production to avoid production delays by keeping machines operating with fewer shut-downs for resharpening. The precision gears, 120 teeth 90 pitch, are made from 24 ga. ¼ hard brass. In heat treatment the die moved only .0005" on the maximum diameter of the gear.

It wasn't a happy coincidence that the tool and die steel was perfectly suited to put production from the tools on a smooth, trouble-free basis. It was planned that way—with the help of the Carpenter Matched Set Method. For the Method not only enabled this plant to eliminate costly experimentation in selecting the right steel, but enabled management to forecast output in advance because they could count on the tools to produce the parts *on time*.

Used in hundreds of plants, the Method offers far more than simplified tool steel selection. It makes machine operators more productive. It enables your plant to carry lower tool steel inventories. It makes heat treating easier, simplifies tool-room and production procedures. What's more, it is amazingly easy to apply. No extra cost or bother. To discover what it can do for you, ask for the new booklet "How to Get Better Tool and Die Performance". THE CARPENTER STEEL CO., 139 W. Bern St., Reading, Pa.

Export Dept.: THE CARPENTER STEEL CO., Port Washington, N. Y.—"CARSTEELCO"

Carpenter

MATCHED TOOL & DIE STEELS

More than top-grade steels . . . a Method to keep tooling and production on schedule!

For your convenience, Carpenter carries warehouse stocks in principal cities throughout the country.

WAREHOUSE STEEL PRODUCTS

(Representative prices, cents per pound, for delivery within switching limits, subject to extras.)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Bds.	C.F. Bds.	H.R. Alloy 4140†‡		Carbon	Floor
New York (city)	6.56	7.57	8.77	6.86	...	6.89	7.83	11.34‖	6.69	6.90	8.31
JerseyCity(c'try)	6.35	7.27	8.47	6.75	...	6.59	7.53	9.54	6.39	6.60	8.01
Boston (city)	6.71	7.55	8.74	6.75	...	6.48	7.74‡	10.80‖	6.76	7.00	8.18
Boston (c'try)	6.51	7.35	8.54	6.55	...	6.28	7.54‡	10.60‖	6.56	6.80	7.98
Phila. (city)	6.35	7.38	8.60	6.70	8.55	6.67	7.69	11.02	6.42	6.49	7.62
Phila. (c'try)	6.10	7.12	8.35	6.45	8.30	6.42	7.44	10.77	6.17	6.24	7.36
Balt. (city)	6.01	7.37	8.62	6.62	...	6.61	7.62‡	11.37	6.52	6.67	7.90
Balt. (c'try)	5.81	7.17	8.42	6.42	...	6.41	7.42‡	11.17	6.33	6.47	7.70
Norfolk, Va.	7.60	...	...	...	...	6.44	8.45	...	7.25	6.64	7.33
Richmond, Va.	6.14	6.95	8.68	6.53	...	6.30	7.38	...	6.58	6.68	7.80
Wash. (w'hse)	6.31	7.61	8.90	6.89	...	6.90	7.78	...	6.93	6.95	8.17
Buffalo (del.)	6.00	6.85	8.66	6.41	...	6.10	7.15	12.27	6.28	6.50	7.87
Buffalo (w'hse)	5.80	6.65	8.46	6.21	...	5.90	6.95	12.07	6.08	6.30	7.67
Pitts. (w'hse)	5.80	...	8.45	5.97	...	5.83	6.90	10.65	5.95	6.10	7.18
Detroit (w'hse)	6.07	6.92	8.34	6.13	7.70-8.03	6.30	7.10	10.92	6.42	6.47	7.52
Cleveland (del.)	6.00	6.85	8.39	6.20	...	6.08	7.18‡	10.99	6.53	6.42	7.72
Cleve. (w'hse)	5.80	6.65	8.19	6.00	...	5.89	6.98‡	10.79	6.33	6.22	7.52
Cincin. (city)	6.28	6.87	8.67	6.38	...	6.28	7.31	11.22	6.57	6.62	7.75
Chicago (city)	6.00	6.85	8.25	6.03	...	6.03	7.00‡	10.85	6.15	6.20	7.38
Chicago (w'hse)	5.80	6.65	8.05	5.83	...	5.83	6.80‡	10.65	5.95	6.00	7.18
Milwau. (city)	6.17	7.02	8.22	6.20	...	6.20	7.27‡	10.02	6.32	6.37	7.55
Milwau. (c'try)	5.97	6.82	7.02	6.00	...	6.00	7.07‡	10.82	6.12	6.17	7.35
St. Louis (del.)	6.30	7.15	8.55	6.34	...	633.	7.40‡	11.15	6.55	6.60	7.78
St. L. (w'hse)	6.10	6.95	8.35	6.14	...	6.13	7.20‡	10.95	6.35	6.40	7.58
Birm'hm (city)	5.95	6.80	7.85‖	5.95	...	5.95	8.40	...	6.10	6.25	8.65
Birm'hm(w'hse)	5.80	6.65	7.70‖	5.80	...	5.80	8.40	...	5.95	6.10	8.85
Los Ang. (city)	6.80	8.65	10.00	6.95	11.40	6.77	8.85	12.25	6.80	6.85	9.10
L. A. (w'hse)	6.60	8.45	9.80	6.75	11.20	6.57	8.65	12.05	6.60	6.65	8.90
Seattle-Tacoma	7.46	9.26	9.90	7.89	...	7.22	9.62	10.90‖	6.91	7.24	9.07
SanFran.(w'hse)	6.90	8.35	9.80	6.90	...	6.80	8.70	12.05	6.65	6.90	9.05

* Prices do not include gage extras; † prices include gage and coating extras except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ add 25-cent special bar quality extra; ‖ as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted. Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; [3]—500 to 1499 lb; [4]—450 to 1499 lb.; [5]—1000 to 1999 lb.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (natural), lower lake ports

Old range bessemer	$9.45
Old range nonbessemer	9.30
Mesabi bessemer	9.20
Mesabi nonbessemer	9.05
High phosphorus	9.05

After adjustment for analysis, prices will be increased or decreased as the case may be for increases or decreases after Dec. 1, 1950, in applicable lake vessel rates, upper lake rail, freights, dock handling charges and taxes thereon.

Eastern Local Ore

Cents per unit del., E. Pa.

Foundry and basic 56-62% concentrates contract 17.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	nom.
Long-term contract	24.00
North African hematites (spot)	26.00-28.00
Brazilian iron ore, 68-69% (spot)	32.00

Tungsten Ore

Net ton unit, duty paid

Foreign wolframite and scheelite, per net ton unit	$65.00
Domestic scheelite, mines	65.00

Manganese Ore

Manganese, 48% nearby, $1.18-1.22 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; shipments against old contracts for 48% ore are being received from some sources at 85c-87c.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African	
48% 2.8:1	$39.00-42.00
48% 3:1	44.00-45.00
48% no ratio	30.00-32.00
South African Transvaal	
44% no ratio	$27.00-28.00
48% no ratio	34.00-35.00
Brazilian	
44% 25:1 lump	nom.
Rhodesian	
45% no ratio	$29.00
48% no ratio	31.50-32.00
48% 3:1 lump	50.00-51.00
Domestic—rail nearest seller	
48% 3:1	$39.00

Molybdenum

Sulphide concentrates per lb, molybdenum content, mines	$1.00

REFRACTORIES

(Ceiling prices, effective Feb. 12, 1952, per 1000 units)

Fire Clay Brick

High-Heat Duty: Pueblo, Colo., $85; Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lochhaven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $94.60; Woodbridge, N. J., $99.30; Salina, O., $99.60; Niles, O., $104; Los Angeles, Pittsburg, Calif., $126.

Silica Brick

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., $94.60; Hays, Pa., $100.10; Niles, O., $102; E. Chicago, Ind., Joliet, Rockdale, Ill., $104.50; Cutler, Utah, $111; Los Angeles, $117.

Insulating Fire Brick

2300° *F:* Massillon, O., $170; Clearfield, Pa., $171; Augusta, Ga., Beaver Falls, Zellenople, Pa., Mexico, Mo., $178.

Ladle Brick

Dry Pressed: Bessemer, Ala., $61.60; Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Wellsville, O., $66; Mexico, Mo., $70; Clearfield, Pa., Portsmouth, O., $79.20; Perla, Ark., $88; Los Angeles, $105; Pittsburg, Calif., $106.

Sleeves

Reesdale, Pa., $121; Johnstown, Pa., $121.30; Clearfield, Pa., $128.70; St. Louis, $131.45; Athens, Tex., $134.20.

Nozzles

Reesdale, Pa., $193.60; Johnstown, Pa., $198.55; Clearfield, Pa., $209; St. Louis, $213.95; Athens, Tex., $214.50.

Runners

Reesdale, Pa., $150.70; Johnstown, Pa., $154; Clearfield, Pa., $160; St. Louis, $162.25; Athens, Tex., $166.10.

High-Alumina Brick

50 *Per Cent:* Clearfield, Pa., St. Louis, Mexico, Mo., $158.40; Danville, Ill., $161.40.

60 *Per cent:* St. Louis, Mexico, Vandalia, Mo., $200.20; Danville, Ill., $203.20.

70 *Per cent:* St. Louis, Mexico, Vandalia, Mo., $233.20; Danville, Ill., $236.20; Clearfield, Pa., $240.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered. Spot add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 10.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot add 0.25c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 30-43%, Fe 40-45%, C 0.20% max.). Contract, c.l. lump, bulk 7.0c per lb of alloy, c.l. packed 7.75c, ton lot 8.5c, less ton 9.35c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 14.50c per lb of briquet, carload packed 15.2c, ton 16.0c, less ton 16.9c. Deld. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 12.45c per lb of briquet, c.l. packaged 13.25c, ton lot 14.05c, less ton 14.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3¼ lb and containing exactly 2 lb of Mn and approx. ¼ lb of Si). Contract, c.l. bulk 12.65c, per lb of briquet, c.l. packed 13.45c, ton lot 14.25c, less ton 15.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size — weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.95c per lb of briquet, c.l. packed 7.75c, ton lot 8.85c, less ton 9.45c. Delivered. Spot, add 0.25c.

(Small size—weighing approx. 2¼ lb and containing exactly 1 lb of Si). Carload, bulk 7.1c, c.l. packed 7.9c, ton lot 8.7c, less ton 9.6c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2¼ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

Note: Current prices on chromium, silicon, vanadium, boron and tungsten alloys appeared on page 223, Sept. 22 issue; manganese and titanium alloys and "other" ferroalloys, page 181, Sept. 15.

CEILING PRICES, IRON AND STEEL SCRAP

Prices as set forth in Office of Price Stabilization ceiling price regulation No. 5, as amended Feb. 5, 1952

STEELMAKING SCRAP COMPOSITE

Oct. 2	$43.00
Sept. 25	43.00
Sept. 1952	43.00
Oct. 1951	43.60
Oct. 1947	39.85

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

Basing point ceiling prices per gross ton from which maximum shipping prices are computed on scrap of dealer and industrial origin, and from which ceiling on-line and ceiling delivered prices are computed on scrap of railroad origin.

Basing Point	Grade 1 No. 1 Bundles Dealer, Indus trial	No. 1 Heavy Melt Rail road
Alabama City, Ala	$42.00	$41.00
Ashland, Ky	42.00	44.00
Atlanta, Ga	39.00	41.00
Bethlehem, Pa	42.00	44.00
Birmingham, Ala	39.00	41.00
Blackwood, Va	44.00	46.00
Buffalo, N. Y	44.00	46.00
Butler, Pa	44.00	46.00
Canton, O	44.00	46.00
Chicago, Ill	42.50	44.50
Cincinnati, O	43.00	45.00
Claymont, Del	42.50	44.50
Cleveland, O	43.00	45.00
Coatesville, Pa	42.50	44.50
Conshohocken, Pa	42.50	44.50
Detroit, Mich	43.15	43.15
Duluth, Minn	40.00	42.00
Harrisburg, Pa	42.50	44.50
Houston, Tex	35.00	39.00
Johnstown, Pa	44.00	46.00
Kansas City, Mo	39.50	41.50
Kokomo, Ind	42.00	44.00
Los Angeles	35.00	37.00
Middletown, O	43.00	45.00
Midland, Pa	44.00	46.00
Minneapolis, Minn	38.00	40.00
Monessen, Pa	44.00	46.00
Phoenixville, Pa	42.50	44.50
Pittsburg, Calif	35.00	37.00
Pittsburgh, Pa	44.00	46.00
Portland, Oreg	35.00	37.00
Portsmouth, O	42.00	44.00
St. Louis, Mo	41.00	43.00
San Francisco	35.00	37.00
Seattle, Wash	35.00	37.00
Sharon, Pa	44.00	46.00
Sparrows Pt., Md	42.00	44.00
Steubenville, O	44.00	46.00
Warren, O	44.00	46.00
Weirton, W. Va	44.00	46.00
Youngstown, O	44.00	46.00

Differentials from Base

Differentials per gross ton for other grades of dealer and industrial scrap:

O-H and Blast Furnace Grades	
2 No. 1 Bushelling	Base
3 No. 1 Heavy Melting	$1.00
4 No. 2 Heavy Melting	1.00
5 No. 2 Bundles	1.00
6 Machine Shop Turnings	10.00
7 Mixed Borings and Short Turnings	6.00
8 Shoveling Turnings	6.00
9 No. 2 Bushelling	4.00
10 Cast Iron Borings	6.00
Elec. Furnace and Fdry. Grades	
11 Billet, Bloom & Forge Crops	+ 7.50
12 Bar Crops & Plate	+ 7.00
13 Cast Steel	+ 5.00
14 Punchings & Plate Scrap	+ 2.50
15 Electric Furnace Bundles	+ 2.00
Cut Structurals & Plate	
16 3 feet and under	+ 3.00
17 2 feet and under	+ 5.00
18 1 foot and under	+ 6.00
19 Briquetted Cast Iron Borings	Base
Foundry Steel	
20 2 feet and under	Base
21 1 foot and under	+ 2.00
22 Springs and Crankshafts	+ 1.00
23 Alloy Free Turnings	3.00
24 Heavy Turnings	1.00
25 Briquetted Turnings	Base
26 No. 1 Chemical Borings	3.00
27 No. 2 Chemical Borings	4.00
28 Wrought Iron	+ 10.00
29 Shafting	+ 10.00
31 Old Tin & Terne Plated Bundles	10.00

Unprepared Grades

When compressed constitutes:

32 No. 1 Bundles	6.00
33 No. 2 Bundles	9.00
34 Other than material suitable for hydraulic compression	8.00

Restrictions on Use

(1): Prices for Grades 11 and 23 may be charged only when shipped to a consumer directly from an industrial producer; otherwise ceiling prices shall not exceed prices established for grades 12 and 8, respectively.

(2): Prices established for Grades 26 and 27 may be charged only when sold for use for chemical or ahesive purposes, and in the case of Grade 27 for briquetting and direct charge into an electric furnace; otherwise ceiling prices shall not exceed price established for Grade 10.

(3): Prices established for Grade 28 may be charged only when sold to a producer of wrought iron; otherwise ceiling price shall not exceed ceiling price for corresponding grade of basic open-hearth.

(4): Premiums for Grades 11-18, 20 and 21 may be charged only when sold for use in electric and acid open-hearth furnaces of foundries, or in basic O-H or blast furnace under NPA allocation or OPS authorization.

(5): Prices for Grade 29 may be charged only when sold for forging or rerolling purposes.

Differentials from Base

Differentials per gross ton above or below the price of Grade 1 (No. 1 railroad heavy melting steel) for other grades of railroad steel scrap:

2 No. 2 Heavy Melting Steel	$2.00
3 No. 2 Steel Wheel	Base
4 Hollow Bored Axles and loco axles with keyways between the wheelseats	Base
5 No. 1 Bushelling	3.00
6 No. 1 Turnings	3.00
7 No. 2 Turnings, Drillings & Borings	12.00
8 No. 2 Cast Steel and uncut wheelcenters	6.00
9 Uncut Frogs, Switches	Base
10 Flues, Tubes & Pipes	8.00
11 Structural, Wrought Iron and/or steel, uncut	6.00
12 Destroyed Steel Cars	8.00
13 No. 1 Sheet Scrap	9.50
14 Scrap Rails, Random Lengths	+ 2.00
15 Rerolling Rails	+ 7.00
Cut Rails	
16 3 feet and under	+ 5.00
17 2 feet and under	+ 6.00
18 18 inches and under	+ 8.00
19 Cast Steel, No. 1	+ 3.00
20 Uncut Tires	+ 2.00
21 Cut Tires	+ 5.00
Boisters & Side Frames:	
22 Uncut	Base
23 Cut	+ 3.00
24 Angles, Splice Bars & Tie Plates	+ 5.00
25 Solid Steel Axles	+ 12.00
26 Steel Wheels, No. 3 oversize	Base
27 Steel Wheels, No. 3	+ 5.00
28 Spring Steel	+ 5.00
29 Couplers & Knuckles	+ 5.00
30 Wrought Iron	+ 8.00
31 Fireboxes	8.00
32 Boilers	6.00
33 No. 2 Sheet Scrap	13.00
34 Carsides, Doors, Car Ends, cut apart	6.00
35 Unassorted Iron & Steel	6.00
36 Unprepared scrap, not suitable for hydraulic compression	8.00

Preparation Charges

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of dealer or industrial origin, authorized by OPS, are:

(1): For preparing into Grades No. 3, No. 4 or No. 2, $8.

(2): For hydraulically compressing Grade No. 1, $6 per ton; Grade No. 5, $8.

(3): For crushing Grade No. 6, $3. For preparing into:

(4): Grade No. 25, $6.

(5): Grade No. 19, $6.

(6): Grades No. 12, No. 13, No. 14, No. 16, or No. 20, $10.

(7): Grade No. 17 or No. 21, $11.

(8): Grade No. 18, $12.

(9): For hydraulically compressing Grade No. 15, $8.

(10): For preparing into Grade No. 2, $10.

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of railroad origin shall be:

(1): For preparing into Grade No. 1 and Grade No. 2, $8.

(2): For hydraulically compressing Grade No. 13, $6. For preparing into:

(3): Grade No. 16, $4.

(4): Grade No. 17, $5.

(5): Grade No. 18, $7.

(6): Grade No. 21, $4.

(7): Grade No. 23, $4.

Ceiling fees per gross ton which may be charged for intransit preparation of cast iron are limited to:

(1): For preparing Grade No. 8 into Grade No. 7, $9.

(2): For preparing Grade No. 3 into Grade No. 1, $7.

(3): For preparing Grade No. 3 into Grade No. 1, $4.

CAST IRON SCRAP

Ceiling price per gross ton for following grades shall be f.o.b. shipping point:

Cast Iron:

1 No. 1 (Cupola)	$49.00
2 No. 2 (Charging Box)	47.00
3 No. 3 (Hvy. Breakable)	45.00
4 No. 4 (Burnt Cast)	41.00
5 Cast Iron Brake Shoes	41.00
6 Stove Plate	46.00
7 Clean Auto Cast	52.00
8 Unstripped Motor Blocks	43.00
9 Wheels, No. 1	47.00
10 Malleable	55.00
11 Drop broken machinery	52.00

OPEN MARKET

(Delivered prices include broker's commission.)

Birmingham
(Delivered)

Shoveling turnings	$30.00-32.00
Cast iron borings	30.00-32.00
No. 1 cupola cast	47.00-48.00
Stove plate	42.00
Charging box cast	39.00-40.00
Heavy breakable	36.00-37.00
Drop broken machinery	42.00-43.00
Unstripped motor blocks	35.00-36.00

Boston
(F.o.b. shipping point)

No. 1 cupola cast	41.00
Heavy breakable	36.00
Stove plate	34.00-35.00
Unstripped motor blocks	30.00

Buffalo
(Delivered)

No. 1 heavy melting	43.00
No. 2 heavy melting	43.00
No. 2 bundles	44.00
No. 1 bushelling	44.00
No. 2 bundles	43.00
Machine shop turnings	34.00
Mixed borings, turnings	38.00
Cast iron borings	38.00
Shovel turnings	38.00
No. 1 cupola cast	47.00-49.00
No. 1 machinery cast	49.00-50.00

Chicago
(Delivered)

No. 2 heavy melting	42.50
No. 2 bundles	42.50
Machine shop turnings	33.50
Mixed borings, turnings	35.00-36.00
Shoveling turnings	37.50
Cast iron borings	35.00-36.00
No. 1 cupola cast	47.00-49.00
Charging box cast	43.00-45.00
Heavy breakable	43.00-45.00
Burnt cast	37.00-39.00
Cast iron brake shoes	39.00-41.00
Stove plate	44.00-46.00
Clean auto cast	50.00-52.00
Unstripped motor blocks	37.00-39.00
Malleable	53.00-55.00
Drop broken machinery	50.00-52.00

Cleveland
(Delivered)

No. 1 heavy melting	43.00
No. 2 heavy melting	43.00
No. 1 bundles	44.00
No. 2 bundles	42.00
Machine shop turnings	34.00
Mixed borings, turnings	38.00
Shoveling turnings	38.00
Cast iron borings	38.00
(F.o.b. shipping point)	
No. 1 cupola	49.00
Charging box cast	47.00
Burnt cast	41.00
Stove plate	46.00
Clean auto cast	52.00
Unstripped motor blocks	43.00
Malleable	55.00
Drop broken machinery	52.00

Detroit
(F.o.b. shipping point)

No. 1 cupola cast	49.00†
Heavy breakable	45.00†
Clean auto cast	52.00†
Unstripped motor blocks	43.00†
Drop broken machinery	52.00†
Charging box cast	47.00†

(Ceiling price.

Los Angeles
(Delivered)

No. 2 bundles	29.00
No. 1 cupola cast	49.00

New York
(Brokers' buying prices)

No. 2 heavy melting	35.99
Mixed boring, turnings	29.99
Machine shop turnings	25.99
Cupola cast	42.00-43.00
Unstripped motor blocks	36.00-37.00

Philadelphia

No. 1 heavy melting	41.50†
No. 2 heavy melting	41.50†
No. 1 bundles	42.50†
No. 2 bundles	41.50†
No. 1 bushelling	42.50†
Mixed borings turnings	36.50†
Machine shop turnings	32.50†
Short shoveling turnings	36.50†
No. 1 cupola cast	48.00-50.00†
Unstripped motor blocks	42.00†‡
Heavy breakable	45.00†
Machinery cast	52.00†
Charging box cast	47.00†

(Ceiling price. ‡Nominal
§Shipping point. ††Delivered.

Pittsburgh
(Delivered)

No. 2 heavy melting	44.00†
No. 1 bundles	45.00†
No. 2 bundles	44.00†
Machine shop turnings	35.00†
Shovel turnings	39.00†
No. 1 cupola cast	48.50
Heavy breakable	45.00

(Ceiling price.

San Francisco
(Delivered)

No. 2 heavy melting	31.00
Machine shop turnings	17.00
No. 2 bundles	29.00
No. 1 cupola cast	45.00

Seattle
(F.o.b. shipping point)

No. 1 cupola cast	44.00
Heavy breakable	40.00
Unstripped motor blocks	33.00

St. Louis
(Delivered)

No. 1 cupola	41.00
Unstripped motor blocks	39.00

Youngstown
(Delivered)

No. 2 heavy melting	43.00
No. 2 bundles	43.00
Machine shop turnings	34.00

HAMILTON, ONT.
(Delivered Prices)

Heavy Melt	$35.50
No. 1 Bundles	35.50
No. 2 Bundles	35.50
Mechanical Bundles	32.00
Mixed Steel Scrap	31.50
Mixed Borings, Turnings	32.50
Rails, Remelting	35.50
Rails, Rerolling	44.50
Bushelling	30.00
Bushelling new factory:	
Prep'd	33.50
Unprep'd	31.50
Short Steel Turnings	32.50
Cast Iron Grades†	
No. 1 Machinery Cast	50.00

(F.o.b., shipping point.

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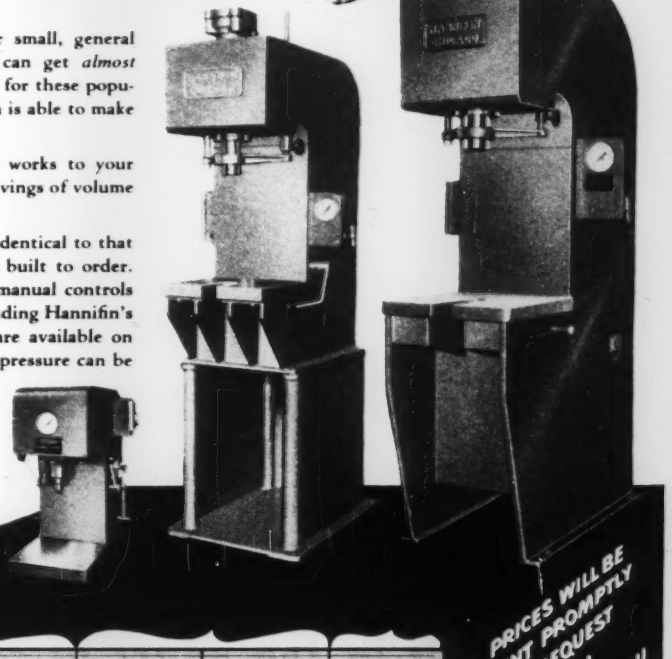

select the press you need from this chart...

CAPACITY, tons	1-ton	2-ton	5-ton	8-ton	10-ton
MODEL NUMBER	F-10	F-20	F-50	F-80	F-101
RAM SPEED (in.-min.) Down	400	190	120*	73*	130
RAM SPEED (in.-min.) Up	800	345	240*	151*	254
PUMP (gpm.)	3.3	3.3	5*	5*	11
MOTOR (hp)	1½	1½	2*	2*	5
STROKE (in.)	6	6	10	10	12
GAP (in.)	10	10	16	16	22
REACH (in.)	6	6	7½	7½	10
BULLETIN	H-784	H-784	135	135	134

Supplied with larger motor and pump when higher ram speed is required.

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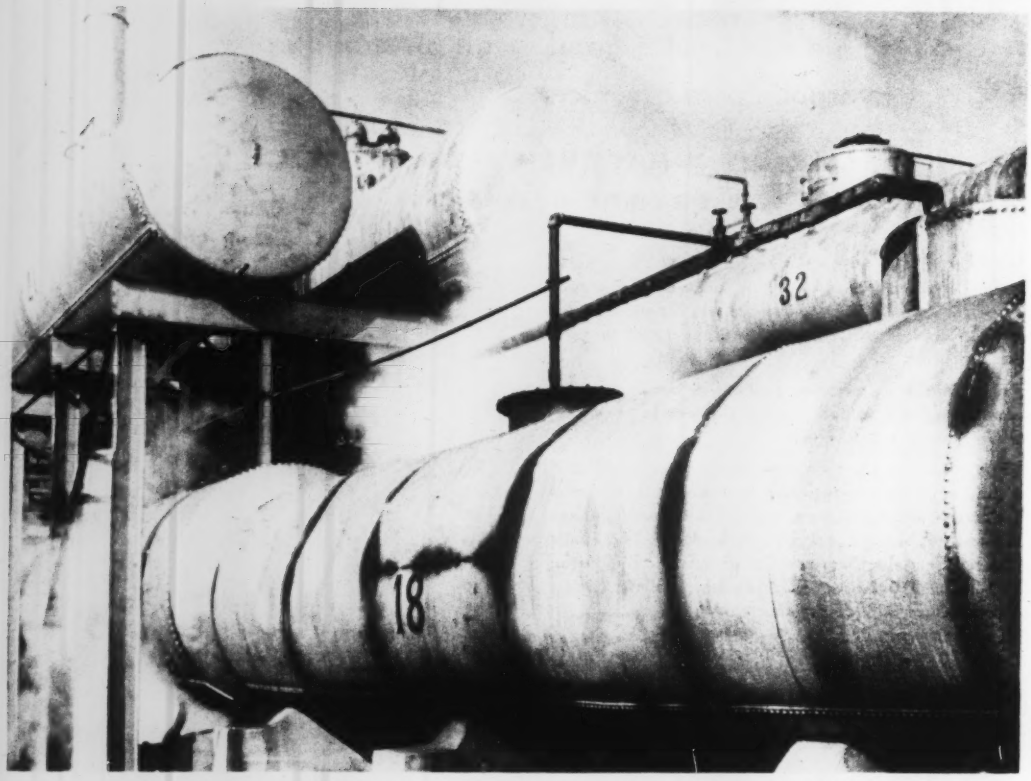

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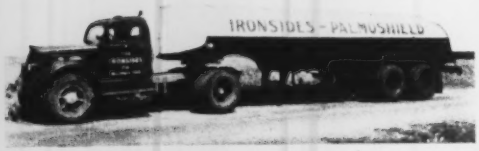
Threats of war . . . shipping uncertainties . . . materials shortages. These headaches fade away when you use Palmoshield as the essential lubricant in your rolling operations.

For Palmoshield is an all-American lubricant made from freely available domestic materials in centrally located Columbus. You buy it as you use it. You get it when you want it. You need not tie up space or funds in stockpiling.

Introduced in January, Palmoshield is already in general use or on test by two-thirds of the major tin-plate producers of this country and Canada. Months of on-the-job experience have established the new lubricant as a proven replacement for imported palm oil.

Palmoshield is subject to exact chemical control: you can specify free fatty acid content to 1 g'r — and get it. It looks, feels, acts, handles like palm oil; requires absolutely no changes in mill operation. It improves production, gives increased tonnage at less cost. Its price is not artificially controlled, but rises and falls freely with the domestic fat market.

To meet expanding demand, manufacturing and storage facilities have recently been greatly enlarged. Palmoshield is now available for immediate shipment in any quantity in both 55-gallon drums and tank car lots. For details write The Ironsides Company, 270 West Mound Street, Columbus, Ohio.



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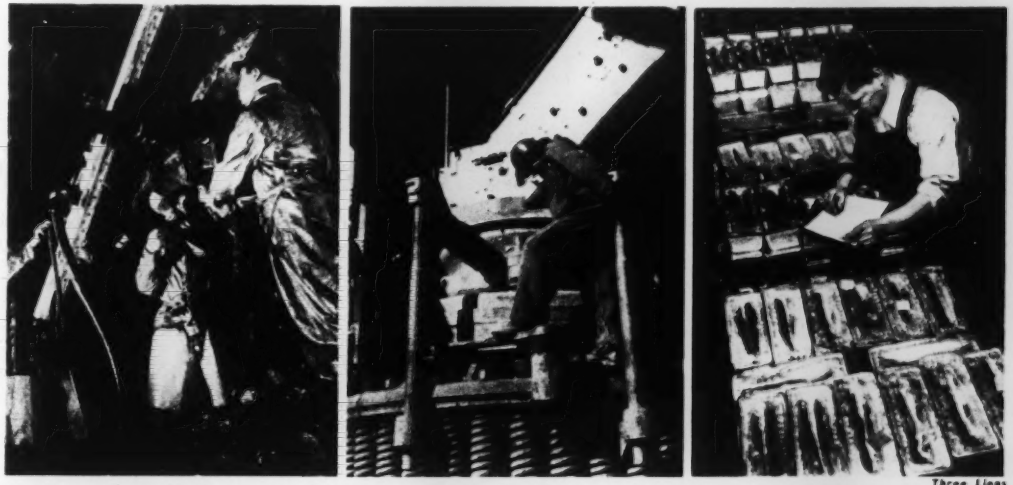

Three Lions

Mexico Mines Silver the Hard Way

Although Mexico supplies about one-third of the world's silver, she does it the hard way. Huge quantities of ore must be dug to extract a modicum of pure silver, and working conditions are hazardous. Although the Mexican government owns the mines, the key personnel are still from the U. S., and they are paid in American currency. The story of silver begins deep in the mines, similar to the one at left. It is part of Real del Monte Silver Mining Co., Mexico's largest producer. The workers pictured here are at a depth of 2500 feet where underground streams are a constant threat. Processing begins in the rock crusher, center, which reduces the ore to a predetermined fineness. At right is the pure silver. Each block is marked with a serial number and the exact weight of each is registered

Sudden or dramatic easing in the metals supply this year is not in the picture. Trend is toward balance, but it will be a slow process

DON'T EXPECT any sudden or dramatic easing in the metals supply this year," or for many products in the first quarter of next year. The trend is toward balance.

Military requirements, now past their peak in percentage take of total supply, will be on a plateau for the next two quarters, cutting a consistent slice of available material. Thus any production increases will be gravy for the civilian economy. But facilities scheduled for operation in the next two quarters won't bolster supplies decisively.

Piecemeal—For manufacturers of nonessential goods to be rescued from their cliff-hanging would require a substantial and sudden increase in output far above the producing potential. Rather than a quick and widespread dropping of controls at a specific date, there will be piecemeal relaxation by product.

Water Worries—In aluminum, the water problem is more acute. Besides the power curtailment in the Northwest that has caused loss of over 10,000 tons of aluminum so far, there's danger in the South. TVA is reportedly low on storage water. Its power goes to Oak Ridge and to Alcoa's Badin, N. C., smelter and Reynolds' facilities at Lister Hill, Ala.

Loss at Badin—a high-cost producer—would total about 450 tons a month. Combination of these setbacks about dooms stockpiling this year.

Cold Comfort — NPA is worried about the copper situation, too. Domestic production and receipts of refined copper from abroad are down for the second month in a row. Much of the accumulated stock in Chilean ports has been shipped.

On the domestic scene, the price setup is still out of whack and NPA has a wary eye on a possible strike at Kennecott's western mines, where Mine-Mill sanctioned its locals to walk out whenever they want. Maximum supplies expected monthly the rest of the year include 50,000 tons from abroad, 80,000 from U. S. mines.

Tin Tempest—Nationalization of tin mines in Bolivia is almost certain but RFC won't get tied up in a long-term purchase contract there for diplomatic reasons. The agency did sign for 6000-7000 tons at $1.175 per pound, f.o.b. South American ports.

Defense Materials Procurement Agency, trying to work the nation out of a nickel deficit, signed contracts with two Canadian firms, East Rim Nickel Mines Ltd., and Falconbridge Nickel Mines Ltd. The former company will mine and crush at least 3500 tons of Sudbury ore monthly and the latter will process the ore.

STEEL's Metal Price Averages for Sept. 1952

(Cents per pound)

Electrolytic Copper, del. Conn.	24.500
Lead, St. Louis	15.800
Prime Western Zinc, E. St. Louis	13.990
Straits Tin, New York	121.50
Primary Aluminum Ingots, del.	20.000
Antimony, f.o.b. Laredo, Tex.	39.000
Nickel, f.o.b. refinery	56.500
Silver, New York	83.250

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 24.50c, Conn. Valley; Lake 24.62c, delivered.

Brass Ingots: 85-5-5-5 (No. 115) 27.25c; 88-10-2 (No. 215) 40.00c; 80-10-10 (No. 305) 33.00c; No. 1 yellow (No. 405) 23.25c.

Zinc: Prime western 14.00-14.08c, brass special 13.75-14.25c, intermediate 14.00-14.50c, East St. Louis, high grade 14.85-15.35c, delivered.

Lead: Common 15.50c, chemical 15.90c, corroding 15.90c, St. Louis.

Primary Aluminum: 99% plus ingots 26.00c; pigs 19.00c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb c.l. orders.

Secondary Aluminum: Piston alloys 26.50c; No. 12 foundry alloy (No. 2 grade) 19.50c; steel deoxidizing grades (notch bars granulated or shot, grade 1 1-3%, grade 2 1-8%, grade 3 1-4%, grade 4 1-2%).

Magnesium: Commercially pure (99.8% + standard ingots, 10,000 lb and over 24.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt 124.50c.

Antimony: American 99.99% and over but not meeting specifications below 29.00c; 99.8% and over, arsenic 0.05% max., other impurities 0.1% max., 29.00c, f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked 56.50c, 25-lb pigs 59.13c, NX nickel shot 60.13c, F nickel shot of ingots for addition to cast iron 56.50c. Prices include import duty.

Mercury: Open market spot New York $190-$193 per 76-lb flask.

Beryllium Copper: 3.75-4.25% Be $1.50 per lb of alloy, f.o.b. Reading, Pa.

Cadmium: Regular straight or flat forms $2.00 del; special or patented shapes $2.15.

Cobalt: 97.99%, $2.10 per lb for 500 lb (keg), $2.42 per lb for 100 lb (case), $2.47 per lb under 100 lb.

Gold: U. S. Treasury $35 per ounce.

Silver: Open market New York 83.2c per oz.

Platinum: $99-$91 per ounce from refineries.

Palladium: $23-$24 per troy ounce.

Iridium: $200 per troy ounce.

Titanium: Sponge (primary) $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Ceiling prices, cents per pound, f.o.b. mill, effective July 1, 1952)

Sheet: Copper 15-oz, yellow brass 10-17, commercial bronze 90% 19-15, 95% 14-18, red brass 5% 43-10, 80% 42-34, best quality 41-35, nickel silver 18% 35-05, phosphor bronze grade A 37% 44-21.

Rod: Copper, hot rolled 41-37, cold drawn 42-62, yellow brass free cutting 33-85, commercial bronze 90% 44-84, 96% 44-07, red brass 85% 42-75, 90% 42-00.

Seamless Tubing: Copper 45-50, yellow brass 43-15, commercial bronze 90% 47-94, red brass 85% 46-03.

Wire: Yellow brass 40-10, commercial bronze 90% 45-44, 96% 44-87, red brass 85% 43-39, 90% 42-63, best quality brass 41-64.

(Base prices effective July 1, 1952)

Copper Wire: Bare soft, f.o.b. eastern mills, 500 lbs, lots 32.26c, 10,000 lb lots 32.02c, l.c.l. 33.42. Weatherproof, 500-999 lb, 33.60c, 10,000 lb 33.36c, l.c.l. 34.76. Magnet wire, del. 15,000 lb or more 38.25c, l.c.l. 39.50.

DAILY PRICE RECORD

1952	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Oct. 1-2	24.50	15.80	14.00	121.50	20.00	39.00	56.50	83.25
Sept. 25-30	24.50	15.80	14.00	121.50	20.00	39.00	56.50	83.25
Sept. 24	24.50	15.80	13.90	121.50	20.00	39.00	56.50	83.25
Sept. 18-20	24.50	15.80	14.00	121.50	20.00	39.00	56.50	82.95
Sept. 12-17	24.50	15.80	14.00	121.50	20.00	39.00	56.50	83.25
Sept. 2-11	24.50	15.80	14.00	121.50	20.00	39.00	56.50	83.25
Sept. Avg.	24.50	15.80	13.99	121.50	20.00	39.00	56.50	83.25
Aug. Avg.	24.50	15.80	14.067	121.50	19.923	39.00	56.50	83.25
July Avg.	24.50	15.80	15.00	121.50	19.00	39.00	56.50	82.855
June Avg.	24.50	15.06	15.24	121.50	19.00	39.00	56.50	82.75
May Avg.	24.50	14.519	19.50	121.50	19.00	42.077	56.50	85.356
Oct. 1951 Avg.	24.50	18.726	19.426	103.00	19.00	42.00	56.50	88.12
Oct. 1947 Avg.	21.50	14.829	10.50	80.00	15.00	33.00	35.00	71.375

NOTE: Copper, Electrolytic del. Conn. Valley. Lead, common grade, del. St. Louis. Zinc, price western E. St. Louis. Tin, Straits del. New York. Aluminum, primary ingots 99% del. Antimony, bulk, f.o.b. Laredo, Tex. Nickel, electrolytic cathodes, 99.9%, base sizes at refinery, unpacked. Silver, open market, New York. Prices, cents per pound, except silver, cents per ounce.

ALUMINUM

(30,000 lb base, freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders. Effective Aug. 4, 1952)

Sheets and Circles: 2s and 3s mill finish, c.l.

Thickness Range Inches	Widths or Diameters In.	Flat Sheet Base	Coiled Sheet Base	Coiled Sheet Circle Base
0.249-0.136	12-48	31.6		
0.135-0.096	12-48	32.1		
0.095-0.077	12-48	32.8	30.6	34.9
0.076-0.061	12-48	33.4	30.8	35.1
0.060-0.048	12-48	33.7	31.0	35.4
0.047-0.038	12-48	34.1	31.3	35.7
0.037-0.030	12-48	34.5	31.7	36.3
0.029-0.024	12-48	35.1	32.0	36.8
0.023-0.018	12-36	35.7	32.7	37.5
0.017-0.017	12-36	36.4	33.3	38.4
0.016-0.015	12-36	37.3	34.0	39.5
0.014	12-24	38.3	35.0	40.8
0.013-0.012	12-24	39.3	35.7	41.7
0.011	12-24	40.3	36.8	43.1
0.010-0.0095	12-24	41.4	37.9	44.8
0.009-0.0085	12-24	42.6	39.1	46.6
0.008-0.0075	12-24	44.0	40.3	48.4
0.007	12-18	45.6	41.7	50.6
0.006	12-18	47.0	43.1	55.4

* Lengths 72 to 180 inches. Maximum diameter 26 inches.

Screw Machine Stock: 5000 lb and over.

Dia. cir. c of distance across flats	Round R317-T4	Hexagonal R317-T4	Hexagonal 17S-T4
0.125	54.6		
0.156-0.0188	46.2		
0.219-0.313	43.6		
0.375	42.0	48.3	50.4
0.406	42.0		
0.438	42.0	48.3	50.4
0.469	42.0		
0.500	42.0	48.3	50.4
0.531	42.0		
0.563	42.0		47.3
0.594	42.0		
0.625	42.0	45.7	47.3
0.688	42.0		47.3
0.750-1.000	41.0	43.1	44.6
1.063	39.4		43.1
1.563	38.9	41.5	43.1
1.625	38.3		41.5
1.688-2.000	38.3		

LEAD

(Prices to jobbers f.o.b. Buffalo, Cleveland, Pittsburgh. Sheets: Full rolls, 1 to 99 lb, or more $21.00 per cwt; add 50c per cwt 100 sq ft to 140 sq ft. Pipe: Full coils $21.00 per cwt. Traps and bends: List prices plus 20%.)

ZINC

Sheets 24.00c, f.o.b. mill 36,000 lb and over. Ribbon zinc in coils 24.25c, f.o.b. mill 36,000 lb and over. Plates, not over 12 in., 22.50c; over 12 in., 22.50-23.00c.

"A" NICKEL

(Base prices f.o.b. mill)

Sheets, cold rolled 77.00c. Strip, cold rolled 82.00c. Rods and shapes 74.00c. Plates 75.00c. Seamless tubes 100.00c.

MONEL

(Base prices f.o.b. mill)

Sheets, cold rolled 66.50c. Strip, cold rolled 63.50c. Rods and shapes 63.00c. Plates 66.50c. Seamless tubes 93.50c. Shot and blocks 53.50c.

MAGNESIUM

Extruded Rounds 12 in. long 1.31 in. in diameter, less than 25 lb 86.00-82.00c, 25 to 99 lb 76.00-82.00c, 100 lb to 5000 lb 71.00c.

TITANIUM

(Prices per lb 10,000 lb and over, f.o.b. mill) Sheets $15, sheeted mill plate $12, strip $15, wire $10, forgings $6, hot rolled and forged bars $6.

Plating Materials

Chromic Acid: 99.9%, flakes, f.o.b. Philadelphia, carloads 27.00c, 5 tons and over 27.50c, 1 to 5 tons 28.00c, less than 1 ton 28.50c.

Copper Anodes: Base 2000 to 5000 lb, f.o.b. shipping point, freight allowed. Flat, rolled 38.34c, oval 37.84c.

Nickel Anodes: Rolled oval, carbonized, cartridge, 74.50c; 10,000 to 30,000 lb 75.50c; 3000 to 10,000 lb 76.50c; 500 to 3000 lb 77.50c; 100 to 500 lb 79.50c; under 100 lb 82.50c, f.o.b. Cleveland.

Nickel Chloride: 36.50c in 100 lb bags; 34.50c in lots of 300 lb through 10,000 lb; 34.00c over 10,000 lb, f.o.b. Cleveland, freight allowed on 300 lb or more.

Sodium Stannate: 25 lb cans only, less than 100 lb to consumers 86.7c, 100 or 350 lb drums only, 100 to 600 lb 71.60c, 700 to 1900 lb, 69c, 2000 to 9900 lb, 67.3c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Tin Anodes: Bar, 1000 lb and over, $1.42; 500 to 999 lb, $1.425; 200 to 499 lb, $1.43; less than 200 lb, $1.445. Freight allowed east of Mississippi and north of Ohio and Potomac.

Zinc Cyanide: 100 lb drums, less than 10 drums 54.30c, 10 or more drums, 52.30c, f.o.b. Niagara Falls, N. Y.

Stannous Sulphate: 100 lb kegs or 100 lb bbl, less than 2000 lb $1.11; more than 2000 lb $1.06. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Stannous Chloride (Anhydrous): In 400 lb bbl, 98.5%, 100 lb kegs 99.5%. Freight allowed.

Scrap Metals

Brass Mill Allowances

Ceiling prices in cents per pound for less than 20,000 lb, f.o.b. shipping point, effective June 26, 1951.

	Clean Heavy	Red Ends	Clean Turnings
Copper	21.50	21.50	20.75
Yellow Brass	19.125	18.875	17.875
Commercial Bronze			
95%	20.50	20.25	19.75
90%	20.50	20.25	19.75
Red Brass			
85%	20.25	20.00	19.375
80%	20.125	19.875	19.375
Muntz metal	18.125	17.875	17.375
Nickel silver, 10%	21.50	21.25	20.75
Phos. Bronze, 5%	25.25	25.00	24.00

Copper Scrap Ceiling Prices

(Base prices, cents per pound, less than 40,000 lb f.o.b. point of shipment)

Group 1: No. 1 copper 19.25, No. 2 copper wire and mixed heavy 17.75, light copper 16.50. No. 1 borings 19.25, No. 2 borings 17.75; refinery brass 17.00 per lb of dry Cu content for 50 to 60 per cent material and 17.25 per lb for over 60 per cent material.

Group II: No. 1 soft red brass solids 18.50, No. 1 composition borings 18.25 per lb of Cu content plus 63 cents per lb of Sn content; mixed brass borings 19.25 per pound of Cu content plus 60 cents per lb of tin content; unlined red car boxes 18.25; lined red car boxes 17.25; cocks and faucets 16.00; mixed brass screens 16.00; piney bronze solids and borings 16.25.

Aluminum Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment, less than 5000 lb)

Segregated plant scrap, 2s solids, copper free, 16.50; high grade borings and turnings, 8.50; No. 12 piston borings and turnings, 7.50. Mixed plant scrap, Copper-free solids, 10.00; dural type, 9.00. Obsolete scrap: Pure old cable, 10.00; sheet and sheet utensils, 7.25; old castings and forgings, 7.75; clean pistons free of struts, 7.75; pistons with struts, 6.75.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Lead: Heavy 12.50-12.75; battery plates 7.00-7.50; linotype and stereotype 13.50-14.00; electrotype 12.00-12.50; mixed babbitt 14.50-14.75.

Zinc: Old zinc, 6.00-6.50; new die cast scrap, 6.00-6.50; old die cast scrap, 4.75-5.00.

Wire . . .

Wire Prices, Page 143

Boston—Wire mills that have opened books for first quarter orders are not under pressure for the period. Space still is open for December on finer sizes of high and low carbon. Demand leans toward heavier sizes, including heading wire for screw production. Aircraft requirements for screws are spotty with specification changes prevalent. No marked improvement is noted in demand for rope wire, while card wire and other textile items are moving slowly.

San Francisco—Wire, fence and nail supplies are reported about equal to current market demands.

Sheets, Strip . . .

Sheet and Strip Prices, Page 141 & 142

Cleveland—Sheetmakers anticipate strong demand through first quarter next year with carryover from fourth quarter likely to take the bulk of output in the first three months next year. Some makers have opened books for the first quarter and the open tonnage for the period is expected to be snapped up quickly. No easing in supply conditions is likely until the mills clean up accumulated backlogs resulting from the production loss during the June-July steel strike. In some instances deliveries of June tonnage on civilian account still are being made. Decided pickup in requirements of the appliance manufacturers, such as stoves, refrigerators and television sets, is reported currently.

Boston—More carbon sheets and narrow cold-rolled strip will be available in first quarter than was predicted. Some producers now hope for openings before March. Certain consumers are passing up offerings, either because they lack tickets or have sufficient inventories. This applies more to strip than to sheets. Heaviest defense demand in cold-rolled strip is for clip steel. Elliott Bros. Steel Co., New Castle, Pa., is low bidder at 7.95 cents per pound, f.o.b. destination on 1575 tons for the Springfield armory. This specification is WD-1010 and size .032 x 2.287-in.

New York—Producers of hot and cold-rolled carbon sheets generally have opened books for first quarter, several of the larger interests within the past few days. Tonnage for January and February will be supplemental to that already accepted against fourth quarter tickets. Due to anticipated carryovers and to highly rated orders, one leading producer doubts if more than 75 per cent of shipments will be available for civilian work. This mill, however, expects to have a more adequate supply of galvanized sheets and hot strip. Most specialties, including chrome stainless, will be in ample supply.

Philadelphia—Pressure for hot and cold-rolled sheets exceeds expectations. Doubt now exists if supply will balance requirements before well into next year. Capacity is large but demand has spurted with only government limitations holding it within bounds. Featuring district activity seasonally is a stepping up in agricultural equipment specifications. Meanwhile, auto requirements are heavier and there is a highly sustained demand for steel from builders of air-conditioning equipment. Stovemakers are taking all the sheet tonnage offered them. A district manufacturer of television sets is placing substantial tonnages of enameling stock for a new use.

Pittsburgh—Sheet and strip order books have been opened for first quarter. There is little likelihood of placing any January or February tonnage without fourth quarter tickets. Outlook for March appears brighter although there will be some carryover into second quarter.

Los Angeles—Columbia-Geneva Steel Division, U. S. Steel Co., will be able to accept orders for limited tonnages of galvanized sheets and light structurals for fourth quarter rolling, and cold-rolled strip for February rolling. All arrearages will be worked off by end of January.

San Francisco—Sheets again are on the shortage list. This reflects order backlogs accumulated during the steel strike. Before the work stoppage, sheets, noticeably cold-rolled, were in easiest supply in nearly 10 years.

Semifinished Steel . . .

Semifinished Prices, Page 141

Cleveland—Additional open-hearth capacity was added over the last weekend by Republic Steel Corp. The local plant placed in operation another new open-hearth, the third since August. A fourth new furnace will be completed later this month. Capacity of the new furnaces is estimated at 168,000 tons annually each.

Steel Bars . . .

Bar Prices, Page 141

Philadelphia—Shortage of shell steel has focused attention on 28,000 tons of government-owned billets and bars which have been laying at the Girard Point rail head here since last January at a cost of $10,000 monthly in storage. Material comprises 16,000 tons of 5 x 5 billets, 20 and 22-ft. in length, types 1040 and 1060, and 12,000 tons of rounds, 1¼ to 5-in.

The steel was rolled in 1942 by Republic Steel Corp. and shipped to France by this government under Lend-Lease. This year it reappeared in this country, at Girard Point. Frankford Arsenal, it is understood, was going to take bids on the steel and then withdrew from the picture. Inquiry at the Pentagon in Washington, revealed possession lies with Lend-Lease Division of the State Department.

Boston—Users of carbon and alloy bars with military ratings are taking substantial shipments, but others are hard put to make ends meet. Allocations to converters and warehouses take a sizable chunk of production. Producers hope to reduce carryover to the point where some additional first quarter tonnage may be taken before March. This may be possible on smaller sizes. Rounds make up the bulk of military requirements, but flats in most sizes and grades are among bar products in tightest supply.

Pittsburgh—Little easing in steel bar supply can be expected before second quarter next year. Large diameter bars are impossible to obtain because military pressure continues strong. Users can expect little relief in last quarter this year and little more in first quarter. Brighter picture is seen in the small diameters. Greater supply of ⅝-in. and under is available. Demand for wire sizes is not pressing.

Cleveland—With bar mill order books overloaded, prospects for any easing in supply conditions before second quarter next year are dim. The heavy carryover promised from fourth quarter will absorb a large proportion of output in the first three months next year and, barring a decided downturn in business generally, there will be a heavy carryover from first quarter to second quarter. Military requirements bulk large in demand and there is no indication of any letdown in pressure from this direction over coming months.

Chicago—Barmakers report no improvement in the tight supply situation. Set-asides, directives and high ratings put them in a position where much business must be turned away for the balance of the year.

Structural Shapes . . .

Structural Shape Prices, Page 141

New York—Structural business is confined largely to bridges and other public projects. More commercial work is in the planning stage, however, as builders anticipate an easing in government restrictions after the turn of the year. Fabricators meanwhile are focusing interest on high rated work as such business carries assurance of an ample amount of steel.

August structural bookings, according to the American Institute of Steel Construction, amounted to 257,773 tons, against a revised total for July of 221,635 tons. August a year ago bookings amounted to 212,730 tons. Total for the first eight months is 1,736,230 tons, against 2,164,064 tons for the corresponding period of last year.

Structural shipments in August amounted to 225,013 tons, against 236,915 a year ago and compared with a revised figure of 138,001 tons in July. Shipments during the first eight months amounted to 1,723,577 tons, against 1,811,667 in the same period last year. Backlogs amount to 2,363,487 tons, compared with 2,748,215 last year.

Boston—Contractors awarded the Fore river bridge, Portland, Me., asked 12.6 cents and 14.66 cents delivered for carbon and silicon fabricated structural steel respectively, and 3.83 cents and 3.98 cents per pound for erection. This is a 4345-ton plate girder riveted structure. On a wide-flanged beam bridge, St Johnsbury, Vt., the successful contractor quoted 12.50 cents erected. Other bids were slightly lower on some steel items for both bridges, but were higher on other items. New structural inquiry is off and less tonnage is being estimated, mostly public work of a defense type and bridges. Private construction is inactive.

Philadelphia—Small structural shops are adversely affected by gov-

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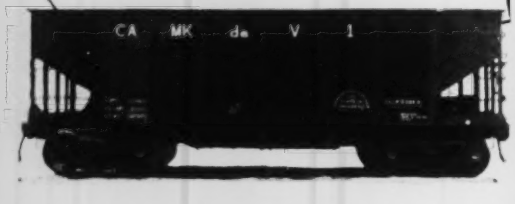

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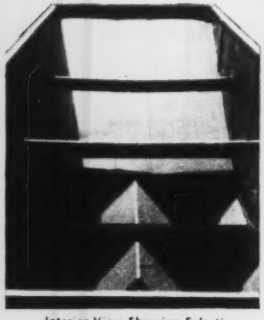

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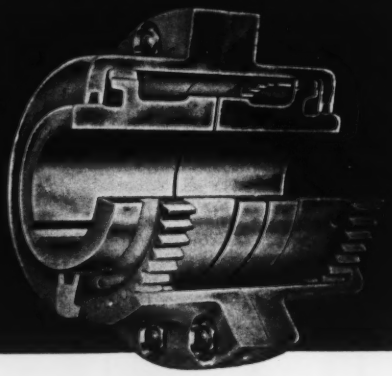

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ernmental restrictions holding up many light commercial projects. Bridges and other public jobs, for which ratings are available, usually require tonnages too large for these fabricators to handle.

Pittsburgh — Among structural shapes, wide flange beams are in greatest demand and shortest supply. Some fabricators who were able to keep going during the strike are now feeling the pinch. Supply of shapes will be better during first quarter. Meanwhile, several construction projects have stopped pending increase in the flow of structurals.

Seattle — Bethlehem Pacific Coast Steel Corp. was awarded 10,000 tons for Bonneville transmission towers and 1100 tons for an Oregon state bridge. Shops are seeking additional first quarter business.

Plates . . .

Plate Prices, Page 141

Pittsburgh—Supply of steel plates continues tight. Suffering most from the shortage are railroad car shops, several of which are down. Books have been opened for first quarter. Carryover of some first quarter orders looks certain and will restrict second quarter availability.

Boston—Shipments of light plates, under 1-in., to warehouses are somewhat heavier due to increased allotments. Direct consumers, however, unless covered by high ratings are short of inventory. Bulk of heavy plates, notably in tight supply, are distributed under Z-2 ratings. Openings in first quarter will be limited to one month in some instances because of carryovers.

Philadelphia—Plate consumers see some tough supply months ahead on civilian account. Stringency, especially in heavier gages, is as pronounced as ever. It will be well into second quarter before any real easing develops. The Claymont, Del., producer has resumed operations on its 120-in. and 160-in. mills after almost a month's suspension for alterations and improvements.

Los Angeles — Fabricators' needs for all gages of plate are mounting. With supplies limited, some shops are close to a shutdown.

Seattle—Plate fabricators are interested in proposed government oil pipeline and storage tanks, involving an unstated tonnage, in the Fairbanks, Alaska, area. It is understood some seamless pipe will be specified.

Tubular Goods . . .

Tubular Goods Prices, Page 145

Chicago — Government directives and ratings so completely blanket output of tubular goods that the consumer lacking preferential treatment has little chance of getting accommodated for months to come. This applies pretty well down the line of types and sizes.

Philadelphia—Production of pipe at the Claymont, Del. plant is scheduled to resume this week after suspension for about two weeks for lack of steel.

Seattle—Demand for cast iron pipe and fittings is seasonally dull. No sizable projects are up for figures. Pipe sales agencies are offering improved deliveries.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 141

Los Angeles—Reinforcing steel is in better supply. Meanwhile, valuation of southern California construction reached $169,144,215 in August, highest for that month in history, and second highest monthly total on record.

San Francisco—Reinforcing steel bars are in more ample supply here. Special types, however, continue scarce.

Seattle—Rolling mill operations are sustained here. Small tonnages are offering freely.

Tin Plate . . .

Tin Plate Prices, Page 142

Cleveland—Producers generally are expected to adopt the new pricing policy on tin mill products announced last week by the subsidiaries of U. S. Steel Co. Under this policy, prices on tin plate and related items are named twice a year, instead of only once at yearend as has been the custom in the past. Announcement of price schedules will coincide with the canning seasons. Current schedules, which became effective July 26, will continue in force until Mar. 31, 1953. At that time prices will be announced for the April through September period, followed by a price announcement for the October through March period. Currently, the tin mills are booked full but are not under extreme shipment pressure. Indications are the order load will support capacity operations through first quarter.

Pittsburgh—New pricing policy for tin mill products has been announced by subsidiaries of U. S. Steel Co. In the past it has been the custom of the company to announce contract prices toward the end of the year to be effective during all of the succeeding calendar year. In the future, however, such prices will be announced twice a year to apply during the periods of April through September and October through March. These periods coincide with the canning seasons. The revision in policy does not involve any change now in present prices which became effective July 26, 1952, and which continue in effect until Mar. 31, 1953.

Pig Iron . . .

Pig Iron Prices, Page 140

Boston—Contrary to the general uptrend in prices, fourth quarter prices on pig iron from the Mystic furnace, Everett, Mass., will be lower by 50 cents per ton with No. 2 foundry quoted $59.25, and malleable $59.75, Everett. These prices are based on June-August costs under contract arrangements with most New England consumers. Because of below-capacity melt, with few exceptions all contract tonnage is not being absorbed from the Everett stack. Basic iron supply is limited with most consumers of that grade operating on low inventories.

New York — District gray iron foundries are pressing harder for iron, although showing no interest in foreign tonnage which can be had at a substantial premium.

Philadelphia—Pig iron supply and demand are in close balance. Consumers of foundry iron show interest in taking more than they are getting, but the moment a producer offers to round out requirements with a grade that varies even slightly from what they ask for, interest ceases.

Cleveland—Some foundries would like to add to their pig iron inventories but the 30-day government limitation prevents anything like normal stockpiling. Pressure for merchant iron shipments is steady, but it is not of a frantic nature with some foundries, mainly lighter shops, looking for additional business. The heavy shops are well occupied, though some signs of a slowing down here and there are indicated as defense jobs are completed resulting in openings in production schedules.

Chicago—Foundries feel they are safely past the worst of the pig iron shortage induced by the steel strike. Iron production is at a good level and receipts more than match consumption. Pickup in castings orders has been slow and currently bookings are at about the same rate as shipments. For most part five-day week operations prevail.

Seattle—Pig iron importers report little buying with prices $10 to $12 per ton above those quoted on domestic material which is readily available. South America currently is the best supply source for imported iron but Chilean prices are out of line.

Stainless Steel . . .

Stainless Steel Prices, Page 145

Boston—Shipbuilding is taking an increasing volume of stainless steel per ship, and larger tonnage than usual of nickel-bearing in heavier shapes is going into minesweeper construction. These vessels must be built as nonmagnetic as possible. They have wooden hulls, but much of the gear is nickel stainless and aluminum. Anchors, chains, screws, rudders and other operating parts are of nonmagnetic materials.

Fasteners . . .

Bolt, Nut, Rivet Prices, Page 145

Cleveland — Industrial fastener manufacturers are passing along to their customers higher costs resulting from the recent increase in raw material prices, chiefly on steel. This pass-through is authorized under OPS General Overriding Regulation No. 35, issued Sept. 10.

The permissible advance is limited to reflect increased raw material costs only, and does not permit adjustments for higher labor, transportation and other costs. Since raw material costs vary from company to company, the increase is effected in a percentage markup differing from company to company, ranging from 2 per cent to 2.46 per cent.

The discount lists that have been in effect for months past continue, sellers simply adding the percentage markup to their billings. However, the fastener makers are pressing for further relief, including whatever allowance they are entitled to under the Capehart amendment. In event requests are favorably acted upon by OPS, it is said, a new discount list

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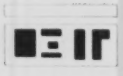

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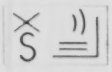

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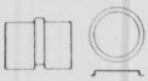

Standard size folding tools do straight, circular or irregular shape folds. Special tools easily made in any tool room.

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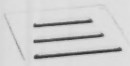

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is likely to be issued. Some in the trade think action may be forthcoming within a week or so.

Pittsburgh—Supply of bolts and nuts continues to improve. Flow of steel to boltmakers has picked up, and a greater range of sizes is available. Still tight are supplies of large diameters. Also hard to get are certain types of stud bolts and alloy bolts. Open space exists in first quarter schedules. Delivery promises for fourth and first quarters are good.

Scrap . . .

Scrap Prices, Page 148

Detroit—On the report that blast furnace operators were not going to ask for earmarked turnings, some interests saw prospects of this grade dropping below ceiling again. However, latest local buy was of earmarked industrial scrap at ceiling. Mills in the Pittsburgh district are reported ready to reach out this far for turnings. Cast grades are in limited demand but bringing ceiling. Dealers, however, are showing greater willingness to sell and some price easiness may be in the offing.

New York—Steel scrap is not moving freely at yard level and shipments against contracts are slower accordingly. Steel scrap prices are at ceiling. Limited tonnage coming out is a firming influence. Cast grades are soft, most quoted close to $5 per ton under ceilings although yard take of cast is sluggish.

Buffalo—One of the three leading mill consumers here held up scrap shipments last week. This was attributed to the fact unloading facilities were tied up by an influx of ore. Steel scrap continues firm at ceiling levels. On the other hand cast grades are easier with prices off $2.50 to $3 from ceilings.

Philadelphia—Some leading consumers of open-hearth scrap are getting in enough material to meet current needs, thus conserving stocks. In at least two instances, however, buying has lagged of late and the mills find themselves short of open-hearth grades. Most grades are holding at ceiling price levels. Major exceptions are No. 1 cupola cast at $48 to $50 delivered, and unstripped motor blocks at $42 delivered.

Pittsburgh—Scrap movement in this area is sluggish. One large steel producer has been out of the market for about 30 days, and others have been buying only small quantities. Stockpiles are large but they have been reduced to some extent in meeting current demands. Electric furnace scrap is moving well but demand for cast grades is negligible.

Cleveland—Steelworks scrap is moving steadily to the mills and stocks are described as comfortable. Demand is not pressing but consumers are keeping their intake pretty much in balance with consumption. Ceiling prices prevail on most grades. Continued support to the market is seen in approaching cold weather when collection and preparation are hampered. Cast grades are relatively easy with foundry operations described as spotty, especially among the lighter shops.

St. Louis—Scrap market is quiet with a month-long decline in dealer shipments continuing, especially of No. 2 steel. There have been no substantial transactions for several weeks, although the mills have been reducing stockpiles steadily. Prices are at ceiling but are subject to freight concessions. Bundles are scarce. Railroad lists were unusually light for September. Now, however, there are signs of an October pickup, several roads planning greater dismantling of old rolling stock.

Birmingham—Considerable open-hearth and blast furnace scrap generated in this district is going to northern mills, but the area's largest consumer is back in the market for limited shipments after holding up releases for two weeks because of limited storage space. Another district mill has requested that all purchases made the first of the month be delivered immediately.

Los Angeles—With mill yards holding comfortable inventories, buying of steelmaking scrap is tapering. Dealers' stocks are low.

San Francisco—Scrap deliveries have tapered, reflecting comfortable inventories at consumers' plants. Prices, however, are holding.

Seattle—Heavy melting scrap is coming out steadily and inventories are rising slowly. Ceiling prices prevail generally on steelworks material. Bundles are quoted $5 under ceiling and cast iron scrap ranges from $33 to $41 per ton.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 145

Philadelphia—Despite peaceful settlement of the mine labor dispute coke demand continues active, indicating consumers had let inventories run low during the summer.

Iron Ore . . .

Iron Ore Prices, Page 147

Cleveland—Iron ore is moving down the lakes in heavy weekly volume as shippers seek to make up the loss in shipments occasioned by the tieup of the fleet during the steel and ore mine strike during June and July. Shipments in the week ended Sept. 29 totaled 3,297,298 gross tons, increase of 107,000 over the preceding week and up 567,976 tons from the tonnage moved in the corresponding week of 1951.

Cumulative shipments in the 1952 lake shipping season now total 51,153,540 tons, off 19,356,617 from the 70,510,157 tons moved in the like period of the 1951 season.

Shipments will be pressed at capacity into December, weather permitting, but with only two full months of the shipping season left shippers will do well to bring down 75 million tons in the 1952 navigation season. However, vessel shipments are being augmented by all-rail movement from the mines.

The 64-vessel fleet of the Pittsburgh Steamship Division of U. S. Steel Co. for the first time in the history of the company shipped more than 1 million tons in a 7-day period in the week ended Sept. 29. The fleet's previous weekly record was 938,020 tons in July, 1943.

San Francisco—Since May, J. R. Simplot Co. has shipped about 200,000 tons of iron ore from its Palisades, Nev., mine to three Japanese steel mills. Shipments to Japanese mills since last September now total around 309,000 tons. Contracts with the Japanese, however, expire Nov. 15.

Warehouse . . .

Warehouse Prices, Page 147

New York—Prevailing 30-day inventory limitation exerts a depressing effect upon steel markets because fear of violation of the regulation causes some buyers to withhold orders, L. B. Worthington, president, United States Steel Supply Division, United States Steel Co., said at a meeting last week of the New York chapter, American Steel Warehouse Association.

M-6, the warehouse order, he said is "basically good but is now outdated." Mr. Worthington said many consumers are buying out of warehouse stocks they don't normally purchase. They're waiting for mill steel to come in and need immediate supplies. Easing of inventory restrictions will see a more normal warehouse demand pattern emerge.

Most warehouses are carrying about 40 per cent stocks now on a tonnage basis. Closest foreign competition comes from bars and certain structural sizes where duty is only $2 a ton.

The warehousing industry in 1951 accounted for nearly 19 per cent of all steel mill products sold (9 million tons of industrial steels, 4 million tons of merchant products and 1 million tons of oil country goods.) Normal inventories are expected at warehouse level by end of second quarter.

Boston—Inventories are building up to pre-strike levels slowly in a limited number of products. While warehouses are taking in more steel, difficulty is experienced in striking balance in any finished product.

Philadelphia—With shipments coming in at a much faster clip, district warehouses experienced the best business in September since March or April. Distributors are chafing under the government regulation which requires them to hold half of incoming shipments of certain major products for 15 days to meet possible military requirements.

Pittsburgh—Receipts by local warehouses are in line with what they are supposed to receive tonnagewise. Complaints arise from the range of sizes mills will accept.

Cleveland—Warehouse stocks continue unbalanced in this area although over-all receipts from the mills are in substantial volume. September business bettered that of the preceding month and volume would have been larger were supplies adequate to meet all demands. Expectations are October business will show continued gain. As has been the case for months past chief inventory shortages are in bars, plates and shapes. Sheet stocks are more plentiful, but demand for certain gages exceeds supply. Indications are it will be first quarter next year before supply conditions permit the distributors to replenish stocks adequately.

Los Angeles—Jack Doxsey, assistant to the president, American Steel Warehouse Association, in an address here last week outlined the rapid growth of the southern Cali-

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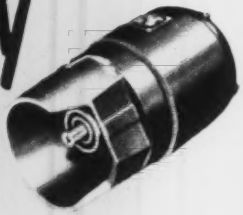

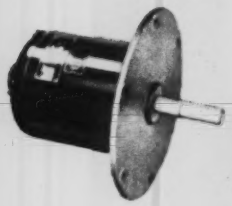

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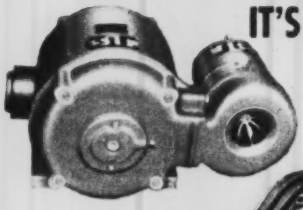

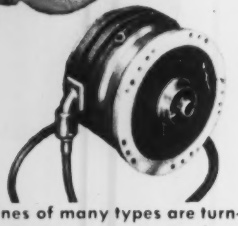

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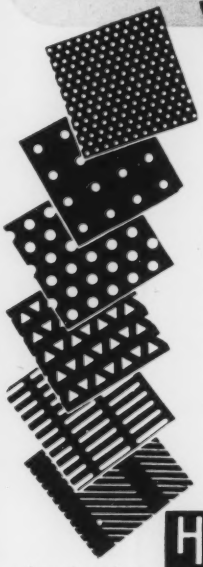

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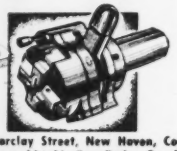

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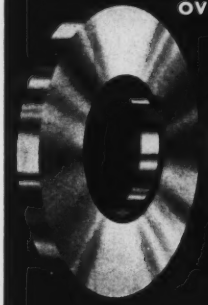

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fornia steel distributing industry from 20 warehouses in 1942 to 90 currently. California warehouses supply more than 25 per cent of manufacturers' steel requirements, and there are more warehouses in the state than in any other.

San Francisco—Warehouse inventories are around 50 to 60 per cent of normal. Stocks are badly broken and unbalanced.

Seattle—Some distributors report increased deliveries from eastern mills but inventories are not improving. Plates and sheets are in short supply, while demand for hot-rolled carbon bars exceeds capacity of West Coast producers.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

10,000 tons, transmission tower steel to Bethlehem Pacific Coast Steel Corp., Seattle, by Bonneville Power Administration, Portland, Oregon.

4345 tons, viaduct and Portland interchange highway and railroad bridge, Fore river, Portland-South Portland, Me., to Bethlehem Steel Co., W. H. Hinman Inc. and Ellis C. Snodgrass Inc., North Anson, Me., joint general contractors, $5,498,691.72; 2000 tons of H-piling, to United States Steel Co.

1100 tons, Oregon state Willsonville bridge, Clackamas county, to Bethlehem Pacific Coast Steel Corp., Seattle.

825 tons, state thruway bridges, Ontario county, New York, to Bethlehem Steel Co.; Lane Construction Co., Meriden, Conn., general contractor.

800 tons, plant building, Du Pont interests, Circleville, O., to Bethlehem Fabricators, Bethlehem, Pa.

750 tons, unit 5, power-house, Long Island Lighting Co., Glenwood Landing, Long Island, to Harris Structural Steel Co., New York.

715 tons, steel H-piling, Corps of Engineers, Tullahoma, Tenn., to Tennessee Coal & Iron Division, United States Steel Co., Fairfield, Ala., $61,533 f.o.b. South Chicago, Ill.

650 tons, state thruway bridges, Oneida and Madison counties, New York, to Phoenix Bridge Co., Phoenixville, Pa.; Lane Construction Co., Meriden, Conn., general contractor.

570 tons, boiler house, Long Island Lighting Co., Glenwood Landing, Long Island, through Combustion Engineering - Superheater Inc., New York, to Harris Structural Steel Co., that city.

540 tons, bridge work, Garden State Parkway, Union county, New Jersey, through George M. Brewster & Son, Bogota, N. J., to Harris Structural Steel Co., New York.

470 tons, plant addition, Armstrong Cork Co., Lancaster, Pa., to Belmont Iron Works, Eddystone, Pa.

465 tons, WF beam bridge and approaches, St. Johnsbury, Vt., to Vermont Structural Steel Co., Burlington, Vt.

440 tons, hangar, Cecil Field, Florida, to Aetna Steel Co., Jacksonville, Fla.; R. E. Clarson Inc., St. Petersburg, Fla., general contractor.

300 tons, strip mill addition, Alan Wood Steel Co., Conshohocken, Pa., to Easton Steel Structures, Easton, Pa.

150 tons, Pen Ridge high school, Berks county, Pa., to Max Cochrin, Philadelphia.

STRUCTURAL STEEL PENDING

5000 tons, two double cantilever maintenance hangars with shops, Lockbourne air field base, Ohio; bids to Corps of Engineers, Huntington, W. Va.

1000 tons, Municipal Domestic Relations Court, Brooklyn; bids closed.

870 tons, state bridge, Northampton county, Pa., general contract awarded Eidemiller, Greensburg, Pa.

600 tons, building, Ft. Meade, Md., Army engineers, Baltimore, bids closing Oct. 8.

500 tons plus, Oregon state Coquille river bridge, general award to Carl M. Halvorson Inc., Portland, Oreg.

400 tons, building, Central Penn National Bank, Philadelphia; bids closed Oct. 3.

240 tons, cable, 50 tons reinforcing, Washington state Trinidad underpassing, general contract to Sather & Sons, Yardley, Wash.

REINFORCING BARS . . .

REINFORCING BARS PLACED

515 tons, hangar, Cecil Field, Florida, to Truscon Steel Co., Jacksonville, Fla.; R. E. Clarson Inc., St. Petersburg, Fla., general contractor.

REINFORCING BARS PENDING

1315 tons, viaduct and Portland interchange highway and railroad bridge, Fore river, Portland-South Portland, Me.; W. H. Hinman Inc. and Ellis C. Snodgrass Inc., North Anson, Me., joint general contractors.

405 tons, bridge substructure, Cuyahoga river, Summit county, Ohio; bids Oct. 15, Ohio Turnpike Commission, Columbus; also 35,000 linear feet steel bearing piles.

150 tons, Washington state road projects, Clark and Yakima counties; bids to Olympia, Oct. 7.

100 tons plus, Oregon state overcrossing Douglas county, Shook Bros., Corvallis, Oreg., awarded general contract.

PLATES . . .

PLATES PLACED

220 tons, previously reported, to Consolidated Western Steel Corp., Seattle, jet fuel tanks, McChord Field, Washington state; general contract awarded Burrows, Milone & Tucci, Tacoma, $219,825.

100 tons plus, accumulators and other equipment, Ketchikan Pulp Co., Alaska, to Chicago Bridge & Iron Co., Seattle.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Alaska Railroad, three 1500-hp lead diesel units and three 1000-hp diesel booster units, 4-wheel trucks, to Electro-Motive Division, General Motors Corp., La Grange, Ill.

Central of Georgia, 24 diesel units, twelve 1600-hp road-switchers to American Locomotive-General Electric Companies, Schenectady, N. Y., and four 1200-hp switchers each to the Baldwin-Lima-Hamilton Corp., Eddystone, Pa., Electro-Motive Division, General Motors Corp., LaGrange, Ill., and Fairbanks, Morse & Co., Chicago.

Delaware, Lackawanna & Western, six 1600-hp road switchers, to Fairbanks, Morse & Co., Chicago.

RAILROAD CARS PLACED

Atchison, Topeka & Santa Fe, 113 stainless steel passenger cars, to Budd Co., Philadelphia.

Central of Georgia, 25 seventy-ton covered hopper cars, to Pullman-Standard Car Mfg. Co., Chicago; these are in addition to a similar number previously placed.

Chicago, Burlington & Quincy, one 125-ton flat, to its Havelock, Nebr., shop.

Chicago & Eastern Illinois, ten 58-passenger stainless cars, to the Budd Co., Philadelphia.

North American Corp., seventy-five 70-ton hopper cars to the Pullman-Standard Car Mfg. Co., Chicago.

St. Louis-San Francisco, one 125-ton flat car, to own shops.

St. Louis-Southwestern, one 125-ton flat, to own shops.

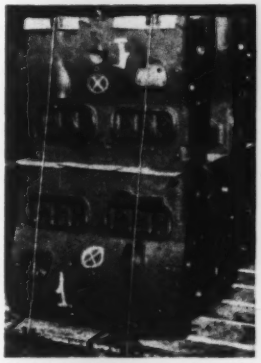
RAILROAD CARS PENDING

Northern Pacific, 200 seventy-ton ore cars and 500 refrigerator cars, program approved.

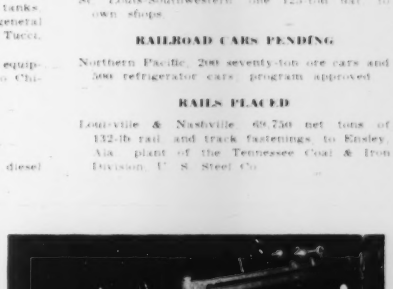
RAILS PLACED

Louisville & Nashville, 69,750 net tons of 132-lb rail and track fastenings, to Ensley, Ala., plant of the Tennessee Coal & Iron Division, U. S. Steel Co.

Have you a tying problem?



Diesel engine crankcases are palletized for interplant movement. 3000 lb. load is firmly secured with 2 Gerrard Straps. (Photo courtesy International Harvester Company, Industrial Power Division.)



This flexible metal hose is securely fastened with 4-way reinforcement. The Gerrard machine on suspension arm is available over a wide work area.

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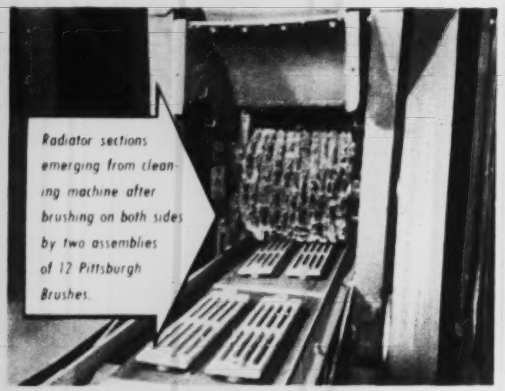

Radiator sections emerging from cleaning machine after brushing on both sides by two assemblies of 12 Pittsburgh Brushes.

Pittsburgh Brushes can help you solve problems like these!

Cleaning Narrow Spaces—National Radiator Company, Johnstown, Pa., cleans 30,000 radiator sections a week! To insure a perfect final finish, even the narrowest spaces must be absolutely clean prior to assembly. Pittsburgh engineers were asked to design a brush that would reach these spaces and would fit National's existing machine. Successful? National reports: "Pittsburgh Brushes do a better job of cleaning and are more economical!"

Preparing Chills—At Continental Foundry & Machine Co., East Chicago, Indiana, chills used to cast iron rolls must be cleaned of the oxidized metal remaining from previous usage, as well as dirt and grease accumulated in storage. After experimenting with other brushes, Continental chose Pittsburgh because they "do the job better and stand up longer than any previously used!"

Improving Original Equipment—The Sommer and Maca Glass Machinery Co., Chicago, Illinois, uses Pittsburgh Brushes in the automatic washing machines they manufacture. Brushes formerly used simply didn't have the over all density pattern needed. Pittsburgh engineers studied the problem and designed a brush which Sommer and Maca approved "because of (its) denser bristle pattern and lower cost."

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Write today for a free copy of our booklet that shows, through actual case histories, how Pittsburgh cuts brushing costs. Address: Pittsburgh Plate Glass Company, *Brush Div.*, Dept. W-11, 3221 Frederick Ave., Baltimore 29, Maryland.

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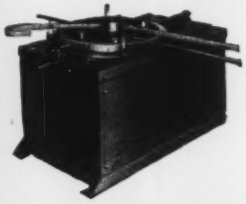
KARDONG FOUR-WAY BENDER

For Concrete Reinforcing Bars

Model D-2



The Model D-2 Kardong Bender is a Four Direction Horizontal Bender. With this bender it is not necessary to turn bars over to make reverse or second bends on beam bars. The Model D-2 is made in two sizes. Model D-2 Standard 6-inch, which will bend bars around collars 2-inch to 6-inch, and Model D-2 Special 8-inch, which will bend bars around collars 2-inch to 8-inch. Capacity of both models 1¼-inch Square Bars. The Model D-2 is a production bender for reinforcing steel fabricating shop. Ask for catalog of our complete line of reinforcing bar benders.

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Here and There in Metalworking . . .

CONSTRUCTION—ENTERPRISE—ORGANIZATIONAL CHANGES

Western Canada Steel To Build Plant

Western Canada Steel Co. Ltd., Vancouver, B. C., plans to erect a $4 million electric furnace, the first unit of a projected big steel industry on Canada's west coast. The first furnace will have a daily capacity of 100 tons. The program calls for installation of five units to be built as the market expands. Ore supplies will be obtained from Vancouver island where ore reserves are estimated at about 10 million tons.

Pivot Punch & Die Expanding

Pivot Punch & Die Corp., North Tonawanda, N. Y., plans to double the size of a new plant which is now being completed. The firm is operating the new plant at about 50 per cent of capacity while finishing the 5400 sq ft addition. Draftsmen now are at work on plans to double the size of the new plant.

Ajax Iron Observes Anniversary

Ajax Iron Works, Corry, Pa., celebrated its 75th anniversary last month. The company has greatly expanded its plant facilities in the post-war period for the specialized manufacture of gas and oil engines.

Oliver Buys Gravity Conveyor Rights

Oliver Corp., Chicago, purchased all resources and facilities used by Carter Industries, Cincinnati, in the manufacture of gravity conveyors. Production and merchandising of the Carter line will be integrated into the business of Oliver's Farquhar Division, York, Pa. The latter division has been engaged for many years in the manufacture of power-driven industrial conveyors as well as other industrial and farm equipment lines.

Foster Wheeler To Build Plant

Foster Wheeler Corp., New York, will erect a plant in Wilkes-Barre, Pa. The company accepted a community offer of a $250,000 site at Mountain Top on which it will locate its two-building plant. The firm plans to spend more than $5 million of its own on the project. Construction work is scheduled to begin in the near future.

Eaton To Expand Pump Plant

Eaton Mfg. Co., Cleveland, authorized expenditure of about $750,000 to expand its Pump Division, Marshall, Mich. This expenditure is principally for equipment and tooling which will represent a substantial increase in the production facilities and capacity of the plant. Early this year the company added 37,000 sq ft of manufacturing space and equipment, costing $1.3 million. This expansion is virtually complete. The two programs will result in doubling the plant's capacity for the manufacture of hydraulic pumps.

Ohio Tramrail Appoints Agents

Ohio Tramrail Division, Porker Corp., Cleveland, appointed as its representatives the Barton Sales Co., Ft. Wayne, Ind.; Hugh Boyd, Mansfield, O.; Tedd Harris Co., North Tonawanda, N. Y. Ohio Tramrail produces a complete line of tramrail installations, transfer bridges, cranes and related equipment.

Mallory-Sharon Opens Branch Office

Mallory-Sharon Titanium Corp., Niles, O., opened a West Coast office. George H. Denny is in charge of the office, temporarily located at 1338 S. Lorena St., Los Angeles. The corporation was formed in 1951 by P. R. Mallory & Co. Inc., Indianapolis, and Sharon Steel Corp., Sharon, Pa., and is a producer of titanium and various titanium alloys in the form of sheet, rolled bar stock, forgings, etc.

Bart-Messing Corp. Expanding

Bart-Messing Corp., Belleville, N. J., completed construction of a building at 125 Manchester Pl., Newark, N. J., to house one of its affiliated organizations, Bart Mfg. Corp. Bart-Messing is a manufacturer of selenium rectifiers, plating and polishing equipment and supplies.

$8 Million Facility Dedicated

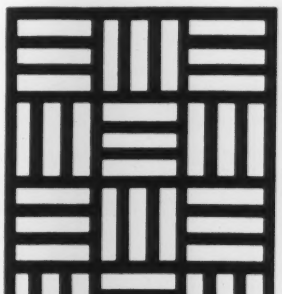
International Harvester Co., Chicago, formally dedicated its $8 million motor truck engineering building and laboratories in Ft. Wayne, Ind. W. D. Reese, manager of engineering for the Motor Truck Division, and P. T. Brantingham, assistant manager of engineering, are the administrative heads of the new operation.

Lukenweld Enters New Field

A range of "package plants" for direct extraction of oil from cottonseed and other seeds of high oil content by the filtration-extraction process is being made available to mills by Lukenweld Division, Lukens Steel Co., Coatesville, Pa. The Lukenweld process is designed to permit the smaller cottonseed crusher to economically convert to solvent extrac-

Hendrick Ornametal

TRADE MARK



Hendrick Ornametal—a decorative, lightweight metal grille designed for a wide variety of applications — is furnished in many attractive designs, the one illustrated being "Baskette."

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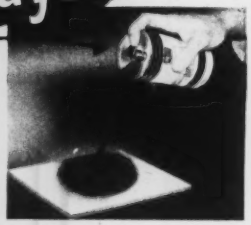

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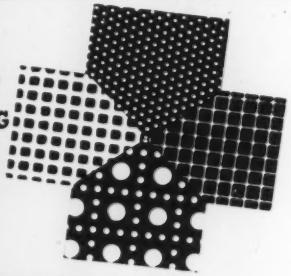

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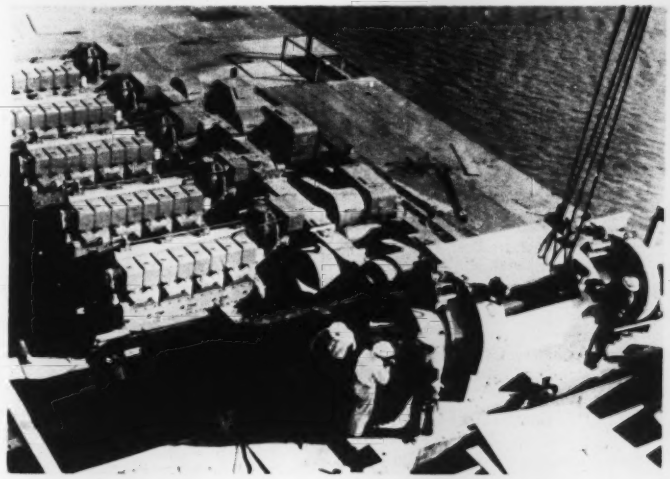

Power Plant Goes to Sea Aboard Drilling Rig

The scene above shows installation of a power plant on drilling barge *Blind Pass* moored in Gulf Coast waters. Several workmen help maneuver the plant into its place aboard the barge. Five Superior PTDSG-8 supercharged dual-fuel engines will supply approximately 3350 horsepower to drilling operations. It is said to be the largest power plant mounted on any drilling rig in the Gulf Coast district

tion without prepressing. Standard plant capacities of 75, 100, 125 and 150 tons will be offered.

Goodyear To Operate AEC Plant

Goodyear Tire & Rubber Co., Akron, will be the operating contractor for the Atomic Energy Commission's uranium-235 production plant to be built between Portsmouth and Chillicothe, O. The $1219 million facility is scheduled to be completed in about four years.

A. S. & W. Checks Air Pollution

American Steel & Wire Division, United States Steel Co., placed in operation a new gas washing installation that removes practically all of the iron ore dust from blast furnace gases at its Donora, Pa., Steel Works. It recovers four times as much flue dust as the former facilities.

Rice Barton Plans Expansion

Rice Barton Corp., Worcester, Mass., builder of paper mill machinery, will erect three additional buildings, adding 25,000 sq ft to its present 175,000 sq ft plant. Additional equipment will be installed.

CEC Instruments Opens Office

Consolidated Engineering Corp., Pasadena, Calif., opened larger offices for its subsidiary, CEC Instruments Inc., at 285 Madison Ave., New York. The offices, in charge of Walter J. Beagan, will handle sales and services for Consolidated's line of analytical instruments for science and industry.

Cee-Bee Chemical Builds Plant

Cee-Bee Chemical Co., Los Angeles, is erecting a plant in Downey, Calif., which will house all of the company's West Coast manufacturing operations except its research and development laboratory which will remain in Los Angeles.

Lewis-Shepard Appoints Agents

Lewis-Shepard Products Inc., Watertown, Mass., appointed Raymond F. Purinton as its exclusive sales and service representative in the Denver territory; Richard S. Stockwell, in the Minneapolis-St. Paul territory.

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Opportunity for experienced man qualified to direct all phases of business. Write Box 580, STEEL, Penton Bldg., Cleveland 13, Ohio.

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Sales Engineer—over 20 years' experience selling Screw Machine Products in Connecticut, Rhode Island, New York State, desires to represent on commission basis Screw Machine Products manufacturer, also Spring & Metal Stampings manufacturer or manufacturer of other tie-in items. References upon request. Write Box 576, STEEL, Penton Bldg., Cleveland 13, Ohio.

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STAINLESS STEEL
TYPE 304

10 gauge 36" x 96", 20,000 lbs.
11 gauge 36" x 96", 2,000 lbs.

Material is HRAP #1 finish.
Original mill packing on skids.
Mill test reports available.

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1334 W. CERMAK ROAD
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Complete equipment for producing steel kitchens now available at ½ replacement cost. All modern, in good condition. Includes dies, cleaning and spraying equipment, ovens, shears, brakes, presses, welding equipment and conveyors. Factory now in operation. Can be inspected by appointment with owner. Delivery can be arranged by late 1952.

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10 to 12 ft. lengths
ALL METALS
Also Screw Machine Products to Order
EASTERN
Machine Screw Corp.
New Haven, Conn.
Makers of H & G Die Heads

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1 — 1500 H.P.
Bought and Sold
New and Rebuilt
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ROCHESTER 1, N. Y.

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3—8" x 12" United 2-High Cold Mills with Combination Pinion Stands and Gear Sets. D. C. Motor Drives; Coilers.

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Cable Address "Foster Pittsburgh"

BORING MILLS 48" and 72" Gisholt
BULLDOZERS, No. 25 and 27 W & W
GRINDER, Thompson 10 x 36" Univ. M.D.
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OPEN TIME
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Will bend 20' x ¼" to 6' x ¾" Pl.

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IF YOU HAVE CAPACITY OPEN,

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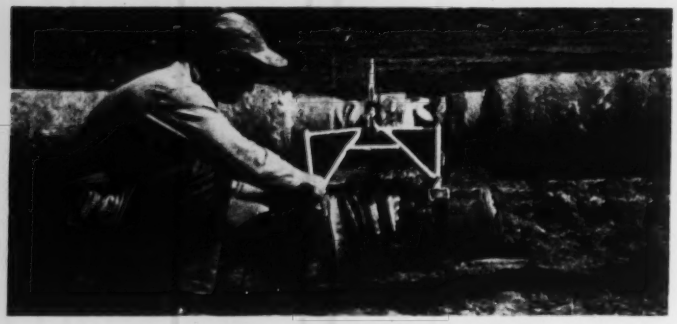
STAINLESS STEEL ROUND BARS

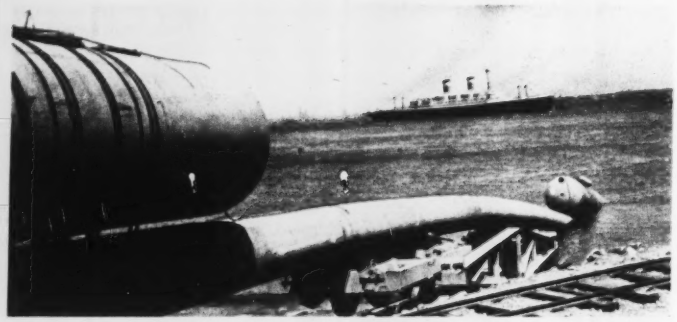
TYPE 303				TYPE 303		
3-16"	Diameter	Weight	500 lbs.	1-3-4"	Diameter	Weight	2,157 lbs.
5-16"	"	"	620 lbs.	1-15-16"	"	"	2,400 lbs.
1-2"	"	"	500 lbs.	3"	"	"	219 lbs.
5-8"	"	"	228 lbs.		TYPE 304		
9-16"	"	"	517 lbs.	1-2"	Diameter	Weight	500 lbs.
11-16"	"	"	231 lbs.	1-5-16"	"	"	1,000 lbs.
3-4"	"	"	1,000 lbs.	3"	"	"	200 lbs.
13-16"	"	"	978 lbs.	3-1-4"	"	"	620 lbs.
15-16"	"	"	23 lbs.		TYPE 309		
7-8"	"	"	25 lbs.	5-16"	Diameter	Weight	600 lbs.
1"	"	"	12,000 lbs.		TYPE 321		
1-1-8"	"	"	944 lbs.	1"	Diameter	Weight	10,000 lbs.
1-3-16"	"	"	210 lbs.		TYPE 347		
1-5-16"	"	"	4,403 lbs.	3-4"	Diameter	Weight	1,002 lbs.
1-3-8"	"	"	2,984 lbs.	1-3-16	"	"	200 lbs.
				1-21-64"	"	"	1,210 lbs.

JANDRU STEEL CORP.
131 Bruckner Blvd. PHONE: CYpress 2-5617 New York 54, N. Y.



Phelps Dodge Corp.'s Habirshaw Cable & Wire Division, Yonkers, N. Y., made the pipe-type compression cable which Consolidated Edison Co. of New York is laying under the Narrows of New York harbor between Brooklyn and Staten Island. The cable, which weighs 9 pounds per foot, will stretch 1-1/3 miles across the gap. Consolidated Edison is using a six-conductor two-circuit arrangement requiring 6800-foot lengths of the cable. It is put into 600-foot lengths of pipe which are welded together and X-rayed, left before being waterproofed with mastic. As a final precaution it is given a 4 to 5-inch concrete coating

Transcontinental Gas Pipeline Corp used 24-inch pipe to make the 1-1 3-mile crossing under New York harbor The 800-foot sections were welded together and X-rayed with radioactive cobalt to detect flaws. Several inches of mastic and concrete protected the pipe as in the case of the Consolidated Edison's power cable. It was eased across the bed of the Narrows by the controlled buoyancy method right. Sixty pontoons were attached to the pipe and released when it was positioned in the channel. The self-stabilizing launcher seen at water's edge propelled and guided the long pipe



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ANTI-CORROSIVE

Anti-Corrosive has millions of stainless steel fastenings *in stock* for immediate delivery . . . plus exceptional production capacity that can fill your requirements beyond stock items faster, *better!*

FREE — Write for Slide Chart 525 which instantly identifies A.N. nos. pertaining to stainless fastenings.

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Manufacturers of STAINLESS STEEL FASTENINGS

CASTLETON ON HUDSON NEW YORK

Gas, Power Go Underwater

Consolidated Edison of New York and Transcontinental Gas lay lines under N.Y. harbor

WHEN CONSOLIDATED Edison Co. of New York bought up Staten Island Edison Co. in 1950, plans got underway to tie the two systems together with a cable under the Narrows of New York harbor between Brooklyn and Staten Island.

About the same time, Transcontinental Gas Pipeline Corp., which supplies New York area utilities with 250 million cubic feet of Texas gas daily, decided to run a pipeline into Brooklyn from its Linden, N. J., pumping station. For the two to share the Narrows crossing was a natural.

Big Ditch—A ditch 25 feet deep and more than 25 feet wide at the bottom was dug across the bed of the stream, which reaches depths of 100 feet. Bulldozers cleared the approaches, mine car tracks were laid and mammoth winches capable of pulling 425,000 pounds were embedded within caisons to pull the pipe across.

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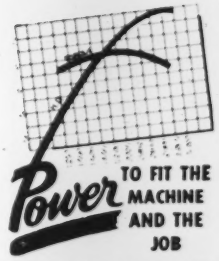
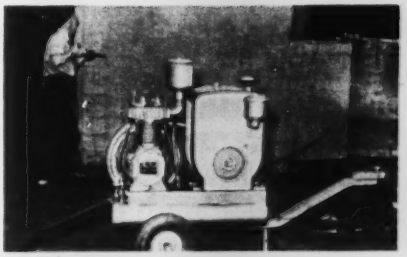


Power TO FIT THE MACHINE AND THE JOB



WISCONSIN-POWERED
Gardner-Denver Compressor

4 cycle
Single Cyl.
3 to 9 hp.

4 cycle
2 Cyl.
7 to 13 hp.

V type
4 Cyl.
15 to 30 hp.

This Model TP0493LE Portable Compressor, made by Gardner-Denver Co., Quincy, Ill., is supplying air for the operation of a Model S17 Utility Drill, engaged in a plant maintenance job. Complete power reliance is placed on the Model TF 2-cylinder Wisconsin Heavy-Duty Air-Cooled Engine.

More and more builders of engine-driven equipment are discovering, to the satisfaction of themselves and their customers, that you can't do better than to specify "Wisconsin Engines"... for dependable power to fit both the machine and the job.

Available in a complete power range from 3 to 30 hp., in 4-cycle single cylinder, 2-cylinder and V-type 4-cylinder models, Wisconsin Air-Cooled Engines provide economical power, without waste, to meet the most exacting requirements. Look into them for your use.

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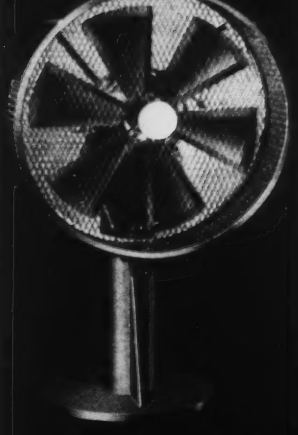
World's Largest Builders of Heavy-Duty Air-Cooled Engines
MILWAUKEE 46, WISCONSIN



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B. F. Perkins & Son, Inc.
HOLYOKE, MASSACHUSETTS
Manufacturers of Industrial Machinery Since 1873

PERKINS MAN COOLERS
TRADE MARK REGISTERED UNITED STATES PATENT OFFICE

NOW you can

BRIGHT-ANNEAL STAINLESS

on a continuous production basis, with

The

SARGEANT & WILBUR

Controlled Atmosphere

CONVEYOR FURNACE

PARTS MADE OF STAINLESS can be

BRIGHT-ANNEALED,

BRIGHT-HARDENED, or

BRIGHT-BRAZED without oxidation . . . they come out scale-free, bright, and clean. No pickling required, no tumbling, no sand blasting.

With our special S. & W. alloy for bright-brazing stainless, the color matches the metal; resists dulling; and the joint is practically invisible. Gold and silver parts are soldered in the same continuous-production furnace with equal success.

Your samples processed free. If you want to see some of your own work bright-annealed, bright-hardened, or bright-brazed in a conveyor furnace, send us samples and specifications.

SARGEANT & WILBUR, INC.
180 Wooden St.
PAWTUCKET, R. I.

Send your illustrated folder "How to BRIGHT-ANNEAL STAINLESS in the S. & W. Conveyor Furnace."

Name

Company

Address

Representatives:
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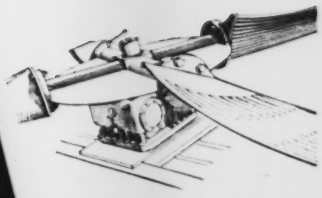


Cleveland Cooling Tower Drives (built in sizes 50 CU to 300 CU inclusive) are rated under Class 2 service conditions, except that thermal limitation does not apply. Heavy, externally ribbed housing effectively dissipates heat to air stream.

Cleveland Type CU . . . ideal drive for cooling towers

●This worm gear drive is designed specifically for cooling tower service. It meets a long-felt need for a compact, heavy duty speed reducer that will operate continuously, at high speeds and for long periods. It is inherently quiet in operation. Extreme conditions of heat and humidity do not affect it. It carries high thrust loads and high radial loads without loss of efficiency. It lends itself to rugged mounting, and due to the simplicity of its design, it is easily installed, serviced and adjusted in the field.

Every CU drive is run in and pretested under load before it leaves the factory. Thousands of units now in use prove its reliability in all classes of service—in the oil fields, in industry, in air conditioning systems in commercial and public buildings—in short, wherever there's a cooling tower, you can depend on CU.

Write for Bulletin 135 for full description of Type CU. Ask also for free literature on other Cleveland units. The Cleveland Worm & Gear Co., 3270 East 80th Street, Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.

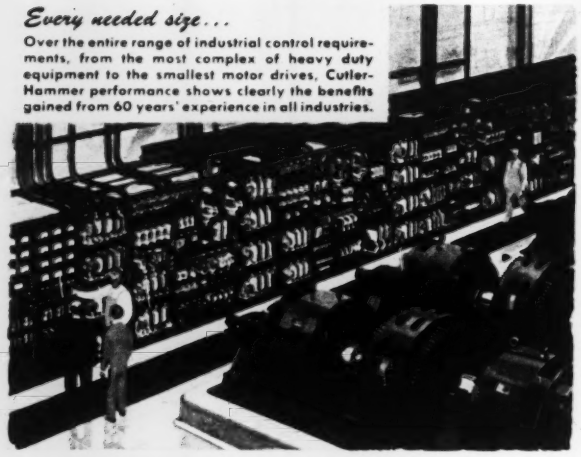
CLEVELAND

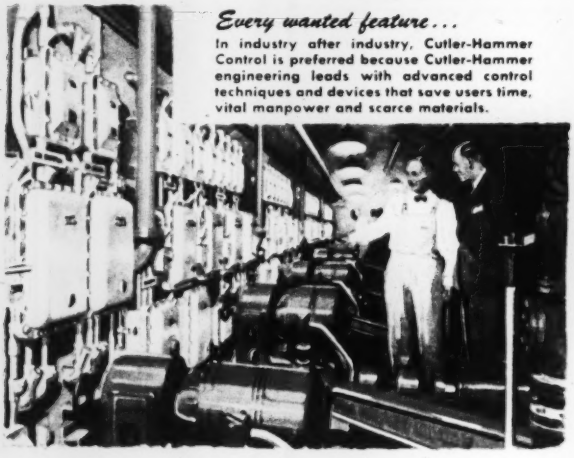
Speed Reducers

Name it and get it

Every needed size...

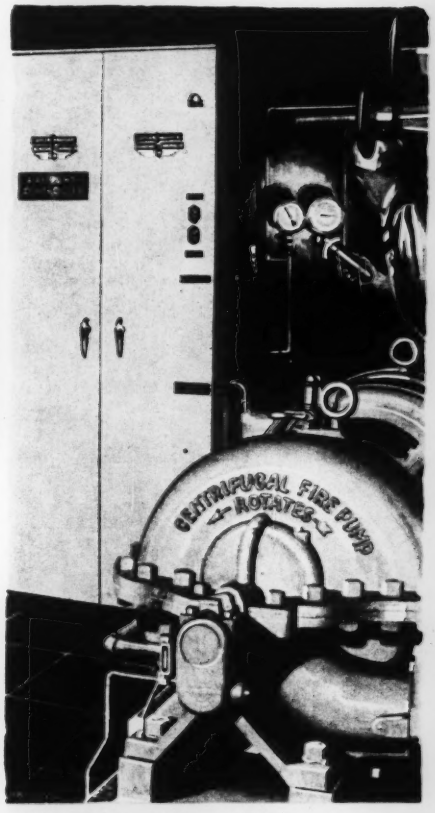
Over the entire range of industrial control requirements, from the most complex of heavy duty equipment to the smallest motor drives, Cutler-Hammer performance shows clearly the benefits gained from 60 years' experience in all industries.





Every wanted feature...

In industry after industry, Cutler-Hammer Control is preferred because Cutler-Hammer engineering leads with advanced control techniques and devices that save users time, vital manpower and scarce materials.



World famous dependability...

Comparison of performance built the Cutler-Hammer reputation for dependability. Wherever the reliable and proper operation of motorized equipment is of utmost importance, experienced buyers insist on C-H Control.

With the ever wider use of electric motors has come a most logical trend toward the purchase of motor control by braad name. And more and more the name specified has been Cutler-Hammer. This is also most logical as no other name in motor control means so much.

For sixty years Cutler-Hammer engineers have worked with the technical men of *all* industries on the specialized needs in motor control. In industry after industry they have been in the forefront of progress devising new control methods and equipment to do things better, faster and at lower cost. Forever creating to only one standard, they made the name Cutler-Hammer synonymous with dependability wherever motor control is used.

Cutler-Hammer general purpose motor control is recommended by a majority of all electric motor manufacturers, is featured as standard equipment by machinery builders, is carried in stock by recognized electrical distributors everywhere.

CUTLER-HAMMER
MOTOR CONTROL
C-H

What this name means when you specify Cutler-Hammer in buying motor control is more for your money . . . better performance and longer life at no extra cost. You too should insist on the genuine and refuse all substitutes. CUTLER-HAMMER, Inc., 1325 St. Paul Avenue, Milwaukee 1, Wisconsin. *Associate:* Canadian Cutler-Hammer, Ltd., Toronto.